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February 13, 1926

The MEXICAN Situation

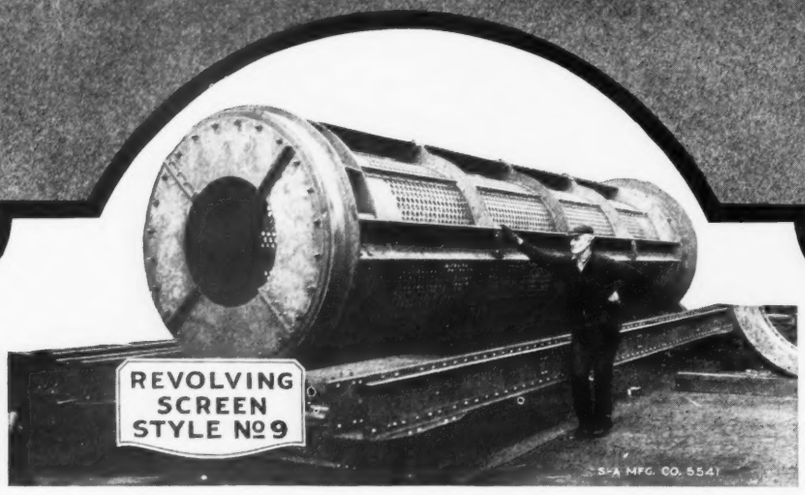
BY ARTHUR BARRETTE PARSONS

Many eyes are turned toward Mexico. Engineers with business in that country; stockholders of companies mining there; and those with money who are seeking opportunity for investment—all these must know how events are trending, if they are to plan their actions wisely. Many statements have been published that are unreliable and biased. Wide circulation has been given to propaganda for conflicting interests. Hence the uncertainty in the public mind. In this article, facts gathered on a recent visit are told regardless of what they tend to prove.

The Durango Lead Smelter and Sulphating Plant, by Edward Hodges Robie

Situation at the Mines ❦ Recent Technical Publications

Company Reports



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Volume 121 February 13, 1926 *Number* 7

ENGINEERING AND MINING JOURNAL-PRESS

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Next Week in New York

THE 133rd meeting of the A. I. M. E. is scheduled for four days this month, Feb. 15 to 18.

MINING ENGINEERS from all parts of the country will attend this meeting and discuss the subjects that are of greatest interest to them. Papers by important men will be read, and no doubt a great deal of good will come from this convention. Certainly, every member who can manage to be in New York next week should plan to be present.

THESE YEARLY CONVENTIONS of the society are appreciated by the members, and offer a real contribution to the progress of the mining industry.

THE PROGRAM is reproduced in this issue of *Engineering and Mining Journal-Press,* and future issues will contain complete reports of what takes place.

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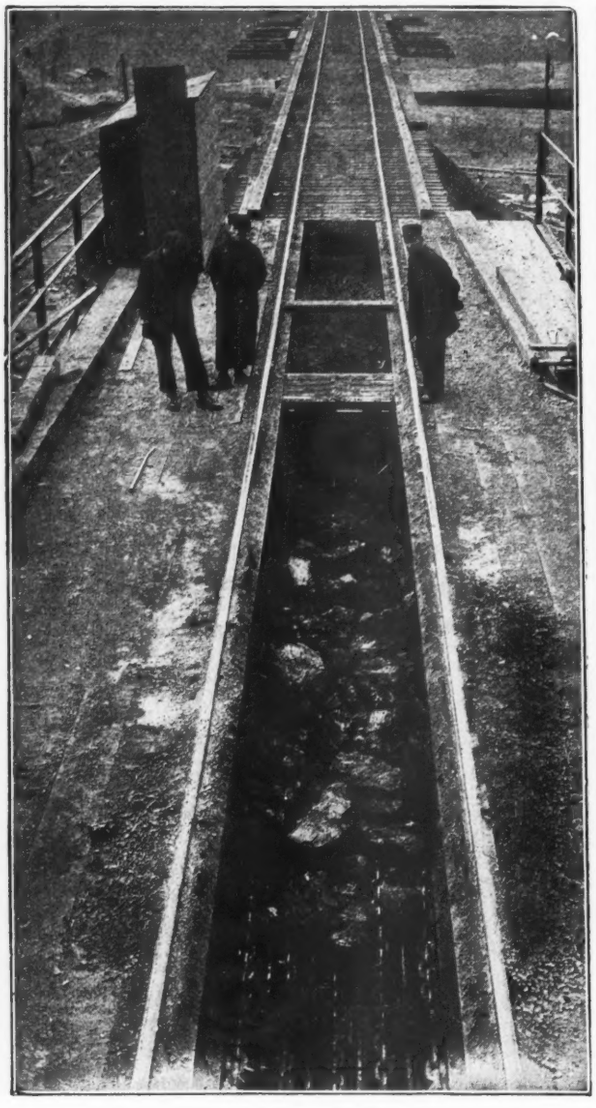

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ENGINEERING AND
MINING JOURNAL-PRESS

JOSIAH EDWARD SPURR, Editor

Volume 121 | New York, February 13, 1926 | *Number* 7

Finding Ore Beneath Glacial Drift

THE DISCOVERY of ore deposits which are buried under glacial drift is one which concerns deeply both northern America and northern Europe. On account of the vast prospecting area of the former, search beneath the glacial drift has not been so definitely pushed as in Europe and methods of prospecting have not been so well developed. In Finland, as it appears from a recent bulletin of the Geological Commission of Finland (No. 67), by Matti Sauramo, this subject has been much investigated, and with great practical success in many cases. In brief, the system lies in careful geological mapping—first, of all bedrock exposures, second, of every glacial boulder of the material—be it copper ore or any other distinctive and desirable ore or rock—whose source is sought. When charted the boulder trains are usually found to be fan-shaped, and the convergence of the fan boulders indicates the direction and approximate locality of the ore in place. Magnetometric or electric surveys follow, and then drilling.

One of the most striking successes achieved by geologists in this way was the discovery of the important Outokumpu copper ore deposit in 1910. Ore in this deposit so far blocked out amounts to seven million tons of a regular 4.5 per cent copper content. Explorations started from a single boulder, found during the excavation for a canal. The foreman took it for a meteorite, but the Geological Commission found it to be a quartzite-sulphide copper ore. The search for the source was delegated to Mr. O. Trüstedt. Magnetometric surveys in the vicinity of the boulder failed to yield results; so that a closer study of the glacial drift near the boulder was made. Among the neighboring boulders were found a few boulders of olivine rock. These suggested that the source of the ore might be in quartzite near an olivine rock. Such a combination was known, from previous geological mapping, to exist in Outokumpu, some 50 kilometers from the single ore boulder in question. Here, in fact, the geologist-prospector found, in a limited area, more boulders of the same ore, but most of the bedrock was covered with glacial drift and peat bogs. The observed fan of ore boulders, as mapped, converged into a certain narrow field, and diamond drilling was resorted to in 1910. Two holes met with no luck. "People," says the writer, "began to talk of thoughtless spending of public funds." But the third hole went through 9 meters of 6 per cent copper ore.

The results of these studies in Finland will be of interest and future use in North America, especially in Canada. One well-known but not sufficiently realized rule is laid down: that the direction of glacial striæ is an unreliable guide in tracing glacial ore boulders to their source, for the striæ represent the last ice movement, whereas the boulders were transported by each ice movement, beginning with the earliest. Tracing of the boulder trains constitutes the reliable geological method.

It is pertinent here to remark upon and admire the splendid geological work in Finland in recent years. The highest degree of scientific excellence has been combined with the proper outlook for practical application and a terseness and clarity of presentation. The bulletins are printed in various languages—now German, now English, now Swedish. The bulletin which is the special occasion for this comment is in English.

The Price of Copper and Other Things

THE STATEMENT is often carelessly made that copper is the only important commodity that is now selling below its pre-war price. A recent bulletin of the Harvard Economic Service contains a table that shows that this metal is not alone in its deflated glory. The price of hides averaged about 18c. a pound in 1913, and in January, 1926, was 15c. The price of that recently much-advertised commodity, rubber, was 82c. in 1913 and 77c. last month. Gasoline has shown little change, the average in 1913 being 16.8c. per gallon compared with 17c. in January, 1926 (the wholesale price, of course, in New York, and not the price most of us have to give the garage man). Cattle have recently been bringing only 9.88c. per lb., whereas the price in 1913 was 8.51. The differential is also small for corn and sugar.

The price levels of copper and other commodities of which the United States has a large exportable surplus have been seriously affected by the pronounced decline in commodity price levels in foreign countries, according to the Harvard bureau. Thus, prices have in some instances declined in the face of expanding industrial activity.

Speaking of commodities as a whole, the prediction is made that "for the next five or six years, it is probable that the trend of prices will be approximately horizontal and that fluctuations will take place around a level approximately 50 per cent above the pre-war level. Additions to the world's stock of gold money will tend to raise prices, but this tendency will be opposed by the depressing tendency of increased production of commodities and perhaps a moderate amount of currency deflation in Europe."

Each commodity, of course, is a law unto itself, but, generally speaking, the idea of a quick return to pre-war price levels has been abandoned by everyone.

Mining and Transportation

HOW MINING and other enterprises in China are hampered by transportation conditions is readily seen from facts given by W. F. Collins, secretary of the China Institution of Mining and Metallurgy, at that society's dinner in Peking on Dec. 21. The most important branch of the industry in the country was coal mining, said Captain Collins, and to this the provision of railways and an adequate supply of cars was of supreme importance. Wagon roads—there is a "good

roads" movement under way in China—were of secondary importance to the collieries, but there was urgent need of more railroads. The economic limit of distance over which a mine could transport its coal by road to a railway in north China was about 15 miles, he said. The result was that coal was consumed only in zones extending 15 miles on either side of the railways and in areas within the same distance of the mines.

The case of a colliery in Shantung 7 miles from a railway and with a daily output of 300 tons was cited. The coal was carried by pack mules and wheelbarrows to the railway. Better means of transport was needed, so $50,000 was spent on a new wagon road and three motor trucks were purchased. Six months later it was found that, owing to depreciation of the trucks and to road repairs as well as to the high cost (in China) of gasoline, the improved transport was costing as much as the old crude native methods, although by far more flexible. Then the colliery built a railway and reduced coal-carrying costs to one-tenth of the former figure.

Much of the unrest in China, in Captain Collins' opinion, is an inarticulate expression of a hunger for railways as the most practical means of improving the standard of living in the interior. According to T. C. Yen, chief engineer of the Government's Board of Communications, four great trunk lines are planned for China which eventually will be built. "Eventually" means, of course, when the money can be found, for a huge sum will be required, which China can hardly of herself provide. The extent to which mining of other minerals than coal is hindered by the conditions described will vary. Iron ore is necessarily handled in large tonnages, so that in its case transportation is an important matter. With the non-ferrous metals, lack of roads and railways is felt in proportion to the bulk and weight of product shipped. Eventually these handicaps will be lessened, but the process will be long and costly.

United Verde Magazine Explosion

THE RECENT EXPLOSION of a surface powder magazine at the United Verde mine affords interesting reflections, but unfortunately, as in other instances, precise information about the cause of the fire in the magazine which immediately preceded the explosion is lacking. Three conjectures are advanced by the mine officials: one that overheating and ignition resulted from the electric heater which was in a small structure at the side of the magazine; second, that workmen who took out powder might have carelessly dropped a lighted cigarette, and, third, that the powder, which was placed in the magazine in a frozen condition, had undergone a chemical change in being brought to a temperature of 90 deg. F.

The arrangement of the heater provides entry for the heated air through a 12 by 14-in. vent at the center of the side and at a small elevation above the floor of the magazine. Thus the flow of heated air would impinge against the side of the stacked boxes. The degree of heating would depend upon the amount of air flow and the temperature of the resistance element in the heater. Four pipe vents, 6 ft. above the floor, provided air escapes at the respective corners of the magazine. There were no vents in the roof, which was of an arch section. Under such an arrangement, if air circulation was impeded, the air might reach such a temperature as to char the wood of a box and possibly cause distillation to take place. The gaseous products of this distillation might have been forced back into the electric heater chamber, and as the heating grid was in contact with the air, ignition of the gases might have resulted. The flame could communicate with the boxes close to the lower vent. If such a chain of events actually occurred, it would appear that the electric heater with exposed grid is a type of installation open to serious question. A thermostat might serve as a safeguard to prevent an excessive temperature rise, and it appears to be possible also to design an electrical heating unit in such a way as to avoid contact of entering air with the heated grid. Apparently some form of hot-water heater, outside of the magazine and heating the air entering it, would be a safer arrangement than the electric heater.

If a lighted cigarette was the primary cause, then the wooden floor of the magazine would be open to objection. All magazine construction should avoid as far as possible use of combustible materials.

Selection of the site of the magazine in question appears to have been justified by the fact that the explosion of about twenty-five tons of gelatin powder resulted in only nominal damage and no loss of life. Although Jerome is a mile distant, and an intervening ridge several hundred feet high isolated the magazine, the force of the explosion wave was sufficient to break plate-glass windows in the town. This is of further interest because Jerome is 500 ft. lower in altitude than the magazine. A near-by magazine, only 165 ft. distant, but separated by a partial barrier from the explosion, was wrecked, the ends being blown out and the arch roof badly fractured, but the contents of the magazine did not explode. The unexploded magazine contained 476 cases of a special quarry powder in bags. Both distance and the presence of barriers, natural and otherwise, played their part efficiently in minimizing danger.

The accident brings out the need for further discussion of the handling and storage of large quantities of explosives. Particularly is it necessary to define safe practice in the design of the accessories used for ventilation and warming the contents of magazines. The concrete construction of the magazine seems to have functioned satisfactorily, for no damage appears to have resulted from flying chunks of concrete. It would be of interest to know how large the residual pieces were. The explosion also raises the question as to the desirability of thermocouples to indicate temperature rises.

Non-Participating Stockholders

THE CASE against non-voting shares in industrial corporations, as presented recently by Prof. W. Z. Ripley, of Harvard, has already been noted in these editorial pages. Professor Ripley has punctured the satisfaction resulting from a broad distribution throughout the population of corporation ownership in the form of stocks, by calling attention to the perfection of devices divorcing representation from stock ownership by the masses, these methods including not only disenfranchised stock, but such devices as that of the holding company—concerning which he quotes with approval a former opinion of Wade Ellis, "This is the most effective, the most invidious, and the cheapest of all combinations in restraint of trade." Professor Ripley observes that as the wide distribution of securities was heralded as transferring corporate ownership from Wall Street to Main Street, the calculated concentration of power, mentioned above, in the hands of a few bankers, means the transfer back of the corporate power,

and the stockholder into the bargain, from Main Street to Wall Street again.

As for the remedy, Professor Ripley is not quite so clear, but he concludes that "in any event, no other safeguard against misuse of power by insiders is so likely to be effective as publicity." And this depends, one may interject, on the dignity and the reliability of journalism. He says further, "For a remedy I am groping as yet, like a child in the dark. I am conscious that things are not right. The house is not falling down —no fear of that. But there are queer little noises about, as of rats in the wall, or of borers in the timbers. I believe that the trouble has to do with the growing dissociation of ownership of property from responsibility for the manner in which it shall be put to use. And now is the time for action."

This subject has been brought up again in these pages because the passing of democratic influence and control in corporate management is one and the same phenomenon as that which we have so long described and discussed editorially—the passing of democratic control in our technical and scientific societies and kindred organizations. And in truth both are contemporaneous and part of a larger movement toward the passing of popular control in politics and government. For a man whose ancestors for generations arranged all matters in conference with their neighbors in town-hall meetings, this obliteration of himself as an individual competent and permitted to take effective part in all matters which affect him will always be a galling and an alarming thing. But in truth the management of great masses of population, of uncounted ramification of industry, can hardly be handled with the same attention to the individual as in Athens or old New England, where the population was small and when its activities were simple. A new era has forced new social governing devices, although the old forms, now growing more or less hollow, survive.

And as to the management of societies, it is with a real thrill of pleasure that one can cast his vote for president of the Canadian Institute of Mining and Metallurgy for 1926-27. Here we have that almost extinct bird, the real election. One may put his mark opposite the name of John A. Allen, professor of geology, University of Alberta, Edmonton, Alta., or that of Louis Stockett, general superintendent, Coal Mines Branch, Department Natural Resources, Canadian Pacific Railway, Calgary, Alta. Both good men and true, no doubt: and both in the geographical center of Canada. One savors the delicious thrill of the patient, who, after he has been directed to choose milk for his meals for some months, is allowed to choose between milk and cocoa for his next: and with a real sense of utility as contrasted to the usual one of futility, we put a man-sized cross opposite the name of —— ——, and mail it to the Secretary in Montreal. Canadians, *morituri salutamus*.

Metric Units and Terminology

OBJECTORS to the adoption of the metric system have had their guns spiked by the Britten Metric Standards Bill that was recently introduced in Congress. Briefly, this bill provides that beginning Jan. 1, 1935, metric weights and measures shall be used for buying and selling goods (unless special permission to use other measures has been obtained) and for charging for transportation of such goods; and that postage, taxes, and duties shall be collected in accordance with such weights and measures. So desirable is a universal decimal system of weights and measures that it is hard to see how honest objection can be made to the proposal to adopt it, save on the grounds that it would inconvenience manufacturers and users of machine tools and machinery in general, and that it would cause confusion in the buying and selling of real estate and in recording the titles involved. The bill meets these objections by expressly excepting from its application the following:

1. The construction or use in arts, manufacture, or industry of any specification, drawing, goods, wares, merchandise, tool, machine, or other appliance or implement designed, manufactured, constructed, or graduated in any system of measurement.

2. The ordering, buying, or selling of manufactured articles, such as tools, machines, or parts of machines, ordinarily known by or designated in any other system of weight or measure.

3. The survey or description of lands within the jurisdiction of the United States or transactions in lands or real estate therein.

Any contract made prior to Jan. 1, 1935, is also excepted from the provisions of the bill. These exceptions should mollify the manufacturers who have long opposed the movement, especially those who have financed a campaign against it.

Transition to the new system is to be made easy for the public. The use of "world yard" for "meter"; of "world quart" for "liter"; and of "world pound" for "500 grams" is recommended in the bill. Indeed, it is likely that the public, once the change is made, will find it easy to accept the meter and call it "yard," the liter and term it "quart," and the half-kilogram and name it "pound." The fact that the actual quantities represented will differ slightly from those signified by the old terms will be unimportant. The public—the American public—is not used to scrutinizing closely the actual quantities received when making purchases. A careless public it is no doubt, and for that reason it should be easy to get it to use the metric units, provided metric terminology is avoided.

Aid for Claim Owners

EVIDENCE OF THE WORK done by the Southern Pacific's Industrial Minerals Service Bureau since its creation a year or so ago has come to hand in the form of a forty-page catalog or list of non-metallic mineral deposits in the states of California, Oregon, Nevada, Utah, Arizona, and New Mexico. The list is classified by states and counties and by minerals. Owners of the deposits have furnished the information, which has not been verified by the railroad bureau, because of lack of opportunity. In any case, of course, such listing is not to be taken as a guarantee of the value or promise of a property.

Apparently all the deposits are for sale. The service thus rendered by the Southern Pacific Co. in helping to bring owners of deposits in touch with those who want their minerals is absolutely free. The railroad, of course, in seeking thus to act as a clearing house for buyers and sellers, is hoping to stimulate the development of the mineral districts along its right-of-way and to build up increased freight and passenger traffic for its cars to handle. No other organization in the United States is performing this service on such an extensive scale. It is a service that mineral owners will find convenient.

Engineers of Note

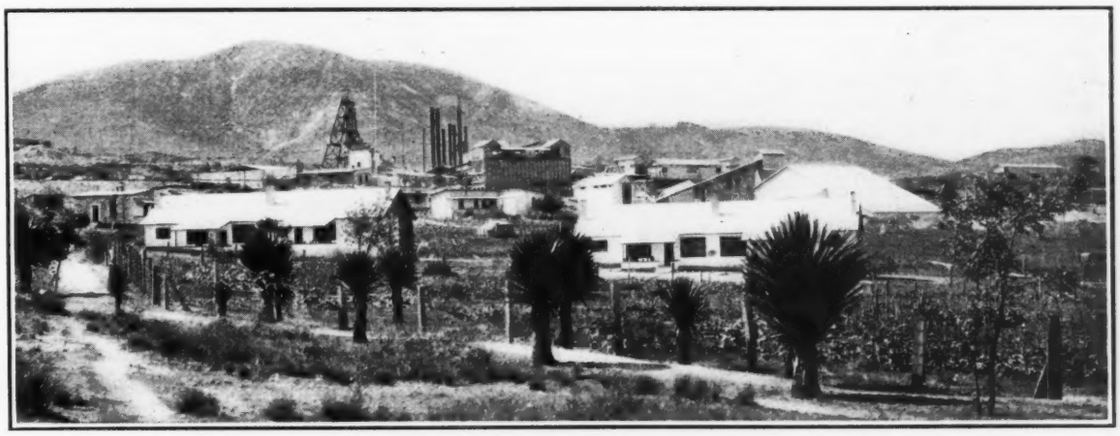
James E. Jopling

By William H. Newett

JAMES E. JOPLING, past president of the Lake Superior Mining Institute and chief engineer of the Cleveland-Cliffs Iron Co., has been connected with the engineering department of that company for thirty years, during the greater part of that time in the same capacity as at present. He is well known throughout the iron country. He was born of English parents in Leghorn, Italy, on Dec. 20, 1862. His father, Charles M. Jopling, who died in the same year, was a civil engineer of considerable reputation and a partner in the construction of the Italian Central railway running from Turin to Naples. The younger Jopling was taken to England, where he lived until 1881, when he came to this country to make his home in Marquette, Mich., on the Marquette range. In that year he obtained a position as transit man on the survey of the Marquette & Western railroad, now a part of the Duluth, South Shore & Atlantic line, which was then being built from Marquette to the iron mines at Ishpeming and Negaunee. In 1883 and 1884 he was employed by the Lake Superior Iron Co., which was working mines at Ishpeming, and during the next two years he was in the Marquette office of Peter White, one of the pioneers of the Marquette range. In 1887 he was given charge of the Phenix mine, at Champion, for Mr. White. For the next six years he had his own office in Marquette, where he engaged in civil and mining engineering, making surveys and reports. Success rewarded his efforts in this direction and before long he had five engineers in his employ. The panic of 1893, however, caused much of the work on the iron ranges to cease, and he was forced to close his office. In 1895 he secured a position as mining engineer with the Cleveland-Cliffs company, and has had his office in Ishpeming ever since. It is doubtful if there is a mining engineering office on earth which is better managed than the one which is under Mr. Jopling's direction. Visiting engineers have never failed to comment favorably upon the remarkable office systems which he has developed—his standardized maps and records of titles of the company's holdings and other interesting features. Eight of the nine mining superintendents in the employ of the company received their early training in mining work under him, as well as many others who are now with other companies. The Cleveland-Cliffs company is one of the largest of the independent operators mining iron ore on the Lake Superior ranges. It owns about 1,000,000 acres of land in the Lake Superior district and at present is operating about fifteen mines. It has four hydro-electric plants, a railroad, charcoal iron furnaces, and other enterprises. All these varied operations require the services of Mr. Jopling's engineering department. Mr. Jopling has also made examinations for his company in many other parts of the United States and in foreign lands. In 1884 he became a member of the American Institute of Mining Engineers and still retains his membership. In August, 1923, he was chosen president of the Lake Superior Mining Institute and served in that capacity until August, 1925. He is a member also of the Mining & Metallurgical Society of America. To all of these societies, as well as various others, he has contributed technical papers. A great experience is his. He has witnessed mining on the iron ranges grow from small pits and shafts to the vast present-day operations.

JAMES E. JOPLING

Mr. Jopling's advice is frequently sought for information on the iron-ore formations of the Lake Superior region, of which he has an intimate knowledge. Or at times it is the desire for details as to his engineering methods that brings visitors to his office. All are cordially received, whatever be their object. One recent caller, who had come to see him in the course of an extended trip on which he had visited many men and mines, said that the welcome extended to him was the most cordial that he had received. Mr. Jopling is popular throughout the Lake Superior district, especially with those who have been connected with his office during his many years of service. He is active in civic affairs in Marquette, where he still resides, and takes particular interest in the American Legion. He is truly one of the outstanding figures of the Lake Superior iron country.



Tiro General mine and mill

During 1925, a new 500-ton selective flotation plant was erected to treat the zinc-lead-silver ores from this old mine, at Charcas

The Mexican Situation

An Unprejudiced Picture of Conditions as They Affect Mining

By Arthur Barrette Parsons
Assistant Editor

APPARENTLY, the longer a Norteamericano—as sojourners from the United States are styled in polite circles—stays in Mexico, the less inclined he is to venture an opinion as to what, politically speaking, is going to happen next. During the month of November, I had an opportunity to discuss the situation down there with about sixty well-informed men in various parts of the country. Included in the number were half a dozen Mexicans, a German, and several Britishers. I talked with two Mexican government officials, with the American Consul at Mexico City, with several manufacturers, with two prominent attorneys, a number of sales managers for automobiles, mining machinery, and other commodities, a banker, two mine owners, and a newspaper man. The others were officials, in various capacities, for mining companies, controlled by "foreign" interests. When a man seemed reticent at the start I assured him that neither would he be quoted nor would any information that he gave me be used in such a way that the source could be identified. This invariably elicited bare facts that were exceedingly illuminating, and frank opinions, which, when they involved future events, the opiner himself, if he were a citizen of the United States, usually supplemented with some observation to the effect that "anyone's guess was as good as another's."

Wide Variation of Opinion

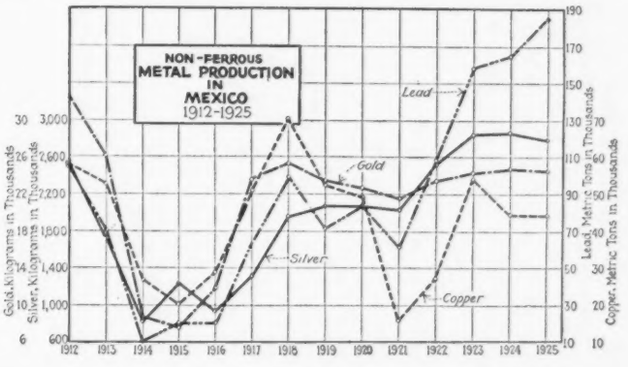
Opinion as to the future ranged from pessimistically apprehensive to sincerely confident. If a man did not like the looks of things he told me so, and told me why. There was fairly general agreement, however, on two points: first, that the avoidance of further violent revolution is the *one* thing most to be desired; and second, that if the so-called radical movement does not result in further burdensome or antagonistic legislation, mining companies, by and large, will be able to continue present operations with reasonable profit, and to continue the recent expansion in activity.

Before considering, in some detail, the five factors—partly accomplished fact and partly alarming possibilities—that are creating apprehension among mining company officials, it will be useful to review briefly the situation at the moment in its technical and economic aspects, apart from political considerations. The following facts are significant:

1. Current output of lead in Mexico is at a higher rate than ever before, and the same is true of zinc. Silver production, though apparently at a little lower rate than in 1924, has increased steadily since 1921, as has that of gold. Copper production, largely governed by the Moctezuma and Cananea companies, near the Arizona border, is curtailed slightly in accord with the prevailing policy of large companies in the United States. The accompanying graph shows the fluctuation during recent years.

2. The tonnage of ore mined is greater than ever before, this being the logical consequence of sustained metal production with a lower average grade of ore. Naturally, it necessitates increased attention to economy of operation: it involves more efficient management and more modern methods.

3. Both of the above-noted factors are reflected in increased use of mining machinery, despite the "cheapness" of labor, usually considered to be attendant upon low wage scales. I have seen the curves representing



Data showing the remarkable revival of mining in Mexico since 1921

the volume of business of two of the largest sellers of mining machinery and equipment, which can be regarded as accurate indices of mining activity. The tendency has been steadily upward for several years, being particularly sharp during 1925. Government records of imports substantiate those of these individual firms. Table I shows sundry figures that indicate the trend. Though imports for mining purposes are not segregated in these data, the fact that mining is the leading industry makes it reasonable to attribute the large increase to expansion in mining activity.

Table I—Value of Sundry Imports Into Mexico

First Nine Months of Each Year

Commodity	1924 Pesos	1925 Pesos	Per Cent Increase
Metal and mineral products	53,169,314	65,941,897	24.0
Machinery and equipment	29,799,449	34,119,946	14.5
Explosives	2,851,493	3,613,378	26.5
All commodities	233,319,590	297,803,695	27.5

Many New Ore-Treatment Plants

4. The number of new concentrators and other primary ore-treatment plants being erected at the mines is remarkable. Particularly significant is the number of flotation plants for the selective concentration of silver-lead-zinc ores. In many districts the evolution from oxidized to sulphide and then to "complex" ores, such as has taken place in the western part of the United States, is progressing rapidly. At least four new plants for the selective flotation of ores containing zinc and lead have been put in operation during the last year, and not fewer than five others are in the course of erection. A concentrator for the selective treatment of a copper-zinc ore, a chloridizing roasting plant, and several cyanide or combination cyanide-concentrating plants are definitely planned. Some of these are large units and some are in the nature of pilot plants; but all of them are in the hands of strong interests that have ample funds at their command. I saw a number of these, and without exception they are designed with a view to the elimination of manual labor, in which respect they differ from many of the older cyanide plants and smelters. The most modern ore-handling equipment is a feature.

5. The smelting plants likewise have had the benefit of large expenditures for remodeling, with the object of reducing operating costs and of handling an increasing proportion of concentrate instead of crude smelting ore. At one large plant a mechanical bedding and reclaiming system, with mechanical charging of both sintering and smelting furnaces, rivals and perhaps surpasses anything in the United States. What is virtually a new copper-smelting and converting plant has been finished during 1925, and in connection with it is the most modern and one of the largest arsenic plants in the world. It has virtually been decided to erect a lead-smelting department at the same plant; and an entirely new lead smelter is to be built in one of the famous old silver camps to handle ore and concentrate from a number of rejuvenated properties.

6. Exploration and development during 1925 were conducted on an unprecedented scale. Although few, if any, actually virgin properties have been opened, hundreds of old mines have been examined. Many of these have been taken over under lease and option, and new veins, new oreshoots in old veins, and portions of old orebodies that were purposely left because of the base character or low grade of the ore have been and are being developed. To demonstrate the substantial character of this work it is only necessary to mention the following list of companies that, among others, have had exploration engineers in the field:

American Smelting & Refining Co.
American Metal Co.
United States Smelting, Refining & Mining Co.
The Mexican Corporation
Howe Sound Co.
Mexico Mines of El Oro
United Eastern Mining Co.
International Mining Co.
General Development Co. (Lewisohns)
El Oro Mining & Reduction Co.
Carnegie Lead Co.
Pedrazzini Mining Co. (Paris)
Guggenheim Brothers
Mazapil Copper Co.
Esperanza Mining Co.

From this brief survey of the situation, it is apparent that the mining industry is increasingly active. It is true, of course, that the high price of lead has a stimulating effect; but the permanent character of most of the recent and current construction work demonstrates that the builders are not basing their calculations on market conditions that they believe to be temporary. High production rates do not invariably signify high earnings; but in this particular instance it is safe to say that, by and large, the industry is enjoying a fair measure of prosperity. For example, the American Smelting & Refining Co., the American Metal Co., and the United States Smelting, Refining & Mining Co., though having extensive interests in the United States and elsewhere, all derive more of their present satisfactory profits from Mexican operations than from those of any other country.

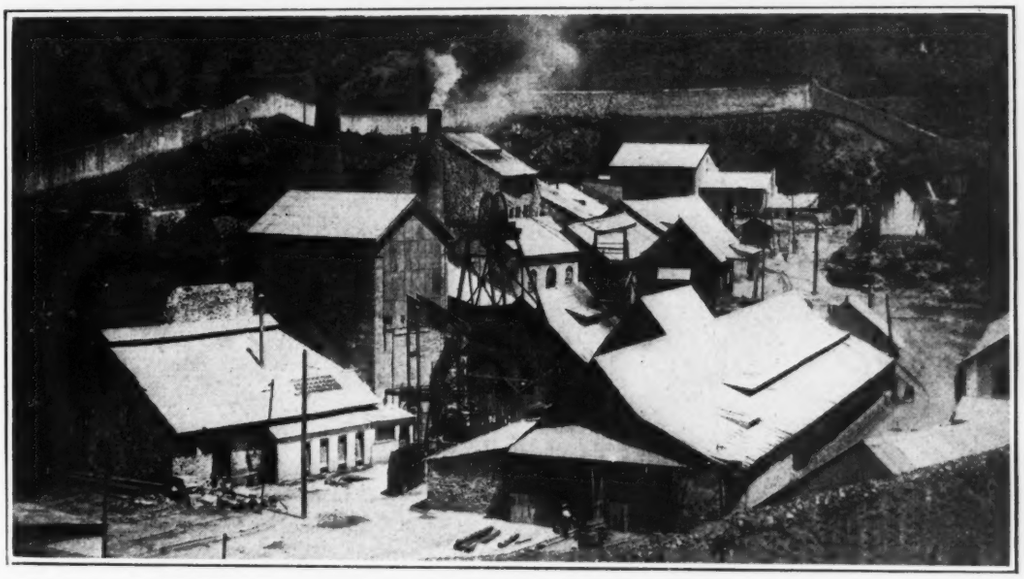
The Causes of Apprehension

There is, however, another side of the picture. Coincidentally with the revival of the last four or five years, there has been a rising tide of so-called "radical" tendencies in the legislative bodies, among officials, and among the workers. This has expressed itself in a number of ways that have added materially to the problems of mining companies operating in the republic. In addition to these there is one other matter (No. 5, below) that is by no means new, but that must be mentioned among the burdens that worry some mine managers, and would worry many others if they would allow them to. They are:

1. Increasing taxation
2. Increasing labor difficulties
3. Higher freight rates
4. "Responsible" engineer legislation
5. Official corruption
6. Legislation adverse to foreign ownership

From the standpoint of the operator of foreign-owned mines, the government, both federal and state, and the workers, with the support of the government, are going to excess in increasing the burdens on industry, particularly mining and smelting. He contends that some of the laws already passed, if enforced to the letter, would compel many mines to shut down. He wonders how soon, if ever, the pendulum is going to swing back in the other direction; and how far it is going to continue in the present direction. The manager for one important company told me frankly that his home officials had decided that if the present trend continued to the point where they were forced to spend 95c. to make a new dollar they would shut down, refuse to pay the consequent fine, allow the government to confiscate the property and run it if it wished to and could do so, and then seek redress through diplomatic channels in Washington.

On the other hand, looking at the situation from the standpoint of the Mexican, two significant facts can be pointed out: (a) In the past, companies operating in Mexico have been "spoiled" with very low taxes, very low wages, and very low rail freights. It is perhaps natural that they compare the present with the old, note the huge increase, and feel abused, instead of making comparisons with the rates prevailing elsewhere in the world today. (b) For every alleged radical law or demand, even for official dishonesty, the Mexicans can point to something quite as extreme, if not a little more so, on the north side of the Rio Grande.



Patio at the Santa Gertrudis mine

Though no longer the main hoisting plant, these buildings and headframe are still in regular use at this famous silver mine, in Hidalgo

This article is not a brief for any one; its object is to present the facts as accurately as possible, even though depending necessarily on the statements of others rather than on first-hand information. Accordingly, I will take up these five subjects in order and endeavor to give an unbiased general description of conditions.

Taxation—Taxes in Mexico are of many kinds, the following being the more important:

1. Federal production tax, based on the value of the metals produced. This tax under the present arrangement usually amounts to from 75 to 90 per cent of all Mexican taxes paid by a mining company. The rate varies according to the purity of the product exported. For example, to stimulate the operation of reduction plants and refineries in Mexico, lead in concentrate must pay a higher tax than lead in base bullion, and the latter stands a higher tax than refined lead. The tax on all metals except gold fluctuates with current market quotations. Table II shows the rates on the important metals for the month of December, 1925. The normal tax on silver is 5 per cent when the market is under 60c. in New York, with an additional 1 per cent for each increase of 10c. The provision of a sliding scale certainly is fair; the government shares the profits from high prices, and foregoes something when prices are not so high. The low rates on base metals, particularly on copper, should be noted. One company that produced $3,800,000 worth of copper and $500,000 worth of silver paid three-fourths of its total tax on silver and one-fourth on copper in 1924.

Table II—Schedule of Production Taxes on Metals—December, 1925

Showing per cent of value levied

Metal	Gold	Silver	Lead	Copper	Zinc
Current value per kilogram, pesos.	1,329.19	45.60	0.44	0.66	0.47
Condition when exported:					
Crude ore	8.5	7.0	2.0	0.25	1.0
Concentrate	8.0	6.5	1.8	0.20	0.9
Precipitate	7.25	5.75			
Impure bullion or matte	7.25	5.75	1.5	0.15	0.8
Refined bullion	7.0	5.50	1.0	0.10	0.7

2. Federal tax on mining claims. This is graduated so as to impose an increasing burden on the company holding a large area. The highest rate applicable to the owner of 100 hectares (1 hectare = 2½ acres) or more is 18 pesos per hectare per year, which can hardly be considered excessive.

3. Federal resmelting, refining, and coining charges for gold, amounting to 0.3 per cent. If gold in any form is exported, an equivalent amount must be returned as bullion to the Mexican mint.

4. Federal stamp taxes. The normal sales tax amounts to one-half of 1 per cent of the amount of the invoice. There are several minor stamp taxes.

5. Miscellaneous federal taxes on *taxes*, both federal and state, for financing public education and paying the public debt, and other special purposes. The 10 per cent surcharge on railroad freight tariffs may be regarded as a special tax.

Plan to Make Income Tax More Important

6. Federal income tax. The maximum rate is now only 8 per cent, and the companies, generally, on their tax returns have made allowances for amortization and depletion. So far, no definite basis has been established for the calculation; but as yet the income tax has not become a factor of consequence in the tax problem. I was told by a well-informed official in the Mexican Government that the ultimate intention is to make the income tax the main source of revenue. Unless the rate is made very high this probably will be satisfactory to foreign companies, because they are allowed to deduct income-tax payments made elsewhere from the amount due their home government. However, in view of the experience of mining companies in the

United States, where many tax payments which they made for 1917 and 1918 have not yet been finally determined, one is rather awed at the tangles that are likely to ensue if this intention is carried into effect. Nevertheless, the proposed plan indicates a desire to place the tax burden where it belongs, and it will relieve those

The Cathedral at Chihuahua

Most of Mexico's cities and towns have imposing cathedrals, usually built from the proceeds of some rich mine in the vicinity

companies which are making a large production from low-grade ores with a very slim margin of profit.

7. State production tax. This levy is limited by the constitution to 2 per cent of the value of gold and silver and 50 per cent of the federal tax on other metals. Needless to say, the maximum is prescribed in most of the various state laws.

8. State property tax. This amounts to one-half of 1 per cent of the appraised value of ore-dressing and metallurgical plants and equipment—certainly a modest rate.

Imports of supplies and equipment are subject to payment of consular fees amounting to 5 per cent of the value, the tax being in effect a protective tariff aimed to stimulate manufacture in Mexico. Some companies include this item of fees in computing their aggregate of tax payments. Table III has been prepared to give some indication of the comparative tax burden in Mexico and in the United States during 1924. As costs resulting from the incidence of the United States tariff are, of course, not classified as tax payments, Mexican consular fees are not included in these data.

On the face of the figures it appears that with respect to individual mines producing silver and gold, the operator in Mexico at the present time must turn over to the government a proportion of the value of his

Table III—Comparative Tax Payments in Mexico and the United States in 1924

Company and Metals Produced	Country	Value of Recoverable Metals	Amount of All Taxes	Ratio of Tax to Value of Product, Per Cent
A—Silver, gold.....	Mexico...	$13,550,000	$1,350,000	9.95
B—Silver, gold.....	Mexico...	1,215,000	119,120	9.8
C—Lead, silver.....	Mexico...	1,490,000	85,400	5.72
D—Lead, silver.....	Mexico...	2,200,000	99,500	4.53
E—Copper, silver...	Mexico...	4,300,000	40,800	0.95
F—Lead, silver.....	U. S. A...	3,500,000	185,000	5.3
G—Silver, gold.....	U. S. A...	2,400,000	99,909	4.16
H—Lead, silver.....	U. S. A...	5,848,000	476,128	8.2
I—Silver, lead.....	U. S. A...	3,800,000	357,000	9.4
J—Copper.....	U. S. A...	7,959,000	373,000	4.7

product slightly in excess of that paid by similar operators in the United States. As to producers of base metals, the advantage appears to be with those operating in Mexico.

Mexican View of Taxation

The Mexican can point to the war period when income, and accordingly total, taxes in the United States were much higher than in 1924, often exceeding 25 per cent of the value of the product; he can argue that reconstruction after a period of eight or ten years of revolution is yet incomplete in Mexico, and that, in consideration of that situation, his government is amply justified in imposing comparatively heavy taxes. He can say, truthfully, that there is no discrimination in Mexico between foreign and domestic corporations. He can argue that the natural resources of his country are being depleted and that except for the money spent in exploitation or preparation for further exploitation, not a cent is made available to improve the financial condition of the country, except such portions of the proceeds as are collected as taxes. That is the very thing that Arizona has been complaining about for years.

Labor—The complaint of mining companies with regard to labor is not so much with minimum wage laws —which in general specify 1½ pesos per day, with minimums of 1.25, 1.8, and 2 pesos in exceptional instances—but with other provisions that are considered unreasonable and with the procedure and attitude of many of the local *juntas*, or boards before whom disputes must be settled.

The Federal Government frankly and openly is pro-labor, and the state governments, though responsible for their own labor laws, take their cues from Mexico City. There, laws are made for the federal district only; but these are used more or less as models for the state laws or *regalamentos*.

Many of the provisions that, though extreme, are not without some justification take on a more serious aspect when it is realized that the present temper of the workers in most instances is to take every possible advantage, and that the authorities are inclined to back them up. The result is that the life of the mine manager may be a continual succession of labor disputes. One assistant manager of a large property told me that he had not had time to look at a mine report for nine months. Some typical provisions are enumerated below. None of the state codes includes all of these, but all are to be found in one or more.

(a) Each employee entitled to two weeks' vacation each year, with full pay.

(b) Workers to have full pay and no work on Sept. 16 and May 1, which are national holidays.

(c) Workers to have double pay for Saturday afternoons and Sundays, with the right to lay off on a week day with full pay, to make up for Sunday work. An exception is made for continuous-operation jobs such as work in cyanide plants.

(d) Company shall furnish transportation to and from work if the distance from the worker's home is more than 4 km.

(e) Company shall supply housing at a monthly rental not to exceed ½ per cent of the value.

(f) Company, if operating outside a town, shall supply houses with adequate space, running water, and sewage disposal.

(g) Employees have privilege of examining the books of the company to determine what is a fair minimum wage. This involves a profit-sharing philosophy.

(h) Local committees of employees shall fix minimum wage.

(i) An employee contracting an "occupational" disease of permanent character shall be entitled to 2,100 days' pay.

(j) Occupational diseases as defined include almost any disease except one arising from venereal causes.

(k) Company cannot discontinue any piece of work unless it shows that it is losing money.

(l) Wages of one employee cannot be raised without increasing those of all doing the same work.

(m) No employee can be discharged without "cause," mere inefficiency not being considered cause.

(n) Full pay of an injured or sick employee under the disability provision starts on the first day that he is unable to work. In the United States the custom is for one week to elapse before the disability allowance, generally less than full pay, begins.

It is not difficult to conceive of some of the difficulties that arise from these provisions. One manager told me that his minor hospital cases had tripled as a result of provision (n). Strained back, for example, is an ailment that no physician can disprove, and it is a temptation to the most honest man in the world to get a few days' rest at full pay.

Provision (m) frequently is a cause of greatly diminished operating efficiency. Men cannot be urged to work harder with the threat of losing their jobs. This, however, and the difficulties that might arise from provision (l) are eliminated often by the institution of contract or bonus systems of payment. As a matter of fact, most underground men are paid from 2.5 to 6 pesos per day, and a great deal of surface work is also done by contract that brings more than the legal minimum. The opinion is general that recent years have seen a marked improvement in the average efficiency of the Mexican worker, whether underground or on the surface.

Boards of conciliation and arbitration (*Junta de Concilliacion y Arbitraje*) are composed of three representatives of labor, three of the employers, and one representative appointed by the government executive. The seventh, and usually controlling member, invariably is inclined to favor the worker. It is significant that this is just the opposite of the situation that exists in the United States, where the seventh member of such a commission usually, if unconsciously, leans toward the employers' side.

Swinging of the Pendulum

One must remember the law of compensation. For many decades, ever since the modern development of Mexican mines began, the Mexican laborer had been woefully exploited. The time was when a foreign shift boss in a mine felt that his day's work normally began with the firing of half a dozen peons. Often he was abusive without any provocation. Wages were terribly low, conditions as regards safety and health in mines were none too good, and the employer concerned himself little with how the miner lived or what he did when off shift. Now, it is only natural that the pendulum, having started back, is likely to swing through a long arc. Having realized their power the workers are exercising it—perhaps to excess. And yet, as I have intimated before, it is usually possible to point to a close parallel on the north side of the Rio Grande for most of the demands. The history of labor "wars" in the United States, with demands for wages up to $15 per day or more, with sabotage, dynamiting, and murder, has no parallel in Mexico. When there have been strikes in the metal mining and smelting districts, at least, there has been little or no violence of any kind.

Regarding welfare work, I believe that all of the large operators have anticipated compulsory legislation. They have established hundreds of schools for workmen's children; public baths; well-equipped hospitals; moving-picture houses; and athletic fields. They have built whole villages of dwellings that are more comfortable than the employees and their families had ever seen. In some cases this perhaps has been overdone; the houses are so good they cannot be appreciated at their true worth. Safety and health work in the mines has been given the attention it deserves. Precautions against lead poisoning have been taken at the smelters, and dangerous machinery is protected with the same care as in the United States. All these things cannot help but make for better personal relations between the workmen and the employers.

There is no use in closing one's eyes to the fact that the labor unions, some local and some affiliated more or less closely with the "Crom," or *Confederacion Regional de Obreros Mexicanos*, as the federation with headquarters at Mexico City is called, are striving to get every concession they can. In that respect they are no different from workers anywhere else. At the same time, they can be made to see where it is to their own advantage to curtail their demands. Two instances will illustrate the point.

A Smelter That Was Not Confiscated

In 1923 the workers at one of the large smelters made certain demands, not including increased wages, before the local *junta*. Without giving the smelter management an opportunity to present its side of the case the board decided in favor of the men, and notified the smelting company, which promptly declined to accede. The upshot was a walkout; the furnaces were banked and the smelter management prepared for an indefinite shutdown. The government officials considered plans for operating the plant, to which the smelter people interposed no objection. In a conference, however, it was pointed out that incoming ores would have to be paid for; that the current payrolls and bills for power, coke, and other supplies would have to be met; that freight would have to be paid on bullion shipped; and that it would be several months before any money would be forthcoming from the sale of the product. Not knowing where to find a million dollars or thereabouts, the government officials decided that further discussion of the question involved in the original labor dispute would be advisable. The company made some minor concessions, the workers returned, and the wind was put on the furnaces, after a little more than two weeks' idleness. Only two out of five froze up.

The other case, more recent, is that of one of the companies working very low-grade silver-gold ores. Conditions had reached a stage where the manager decided there was no profit in continued operation, and he gave the required fifteen days' notice of intention to shut down. The local *junta*, after hearings at which

he laid all his cards on the table, came to the conclusion that by adopting different policies in some particulars the company could continue to operate and earn money. The manager stood his ground, however, and a short time before the day set for suspending work a special board of mediation was appointed by the Señor Morones, Federal Minister of Industry, Commerce, and Labor, whose attention had been called to the situation. Through the good offices of this board an arrangement was effected whereby certain tax rebates were to be made by the Federal Government when the grade of the ore milled was less than 12 pesos per ton, and some changes in labor rulings were to be made by the state officials. The shutting down of the property would have been in the nature of a calamity to the community and the settlement was regarded as being in the public interest. The mines are still operating at this writing.

In many states a profit-sharing law is in operation. A typical law provides that, after 20 per cent of the profits have been allocated to the company to provide for depletion, depreciation, interest, and similar charges, a proportion up to 10 per cent of the excess shall be divided among the employees. The percentage applicable to any enterprise depends on the amount of the surplus profits.

Railway Freight Rates—The main trunk lines connecting the gateways Ciudad Juarez, Laredo, and Tampico with the railroad centers Monterey, Saltillo, Torreon, Aguascalientes, San Luis Potosi, and Mexico City are comprised in what is called the National Railway System. Securities of the companies that are included in this group are the private holdings of foreign individuals. Under the terms of an agreement made in June, 1922, between a committee of foreign bankers, headed by Thomas W. Lamont and President Obregon, the Mexican Government took over the operation of these roads, guaranteeing at the same time the payment of interest amounting to about 480,000,000 pesos per year.

Despite increased rates and surcharges on all freights paid, the government found that it was unable to meet these obligations. Revenues were increased, but operating costs also increased, principally because of higher labor costs. The railway workers are strongly unionized, and the unions certainly have accomplished a great deal for their members in the last two years. This situation is strongly reminiscent of the period of government operation in the United States.

At the same time the physical condition of the properties has been improved. Generally speaking, the roadbeds are in better condition and the railroad companies themselves have more and better equipment than they had. Simple but conclusive proof of this last statement is the internment at different points of locomotives, and, to a less extent, freight cars, owned by the mining companies. During the years of turmoil from 1912 to 1922 it became imperative for the larger companies to own rolling stock and to maintain it in repair at their own shops. Even if railroad-owned cars were to be had—and usually they were not—a mine or smelter manager never knew how far toward its destination a car or a train would get, even after he saw it safely started. The railroad company always has supplied the operating crews; but the freight cars and particularly the locomotives were put in first class condition by the companies so that the chance of a reasonably expeditious trip was good.

Much of this equipment is still in use; but the government naturally does not make a deduction in the freight bill sufficient to cover the cost to the mining company of providing cars and locomotives. Accordingly, when the railroads have plenty of equipment to handle the traffic properly on any particular division, some of the privately owned rolling stock is idle. That is the condition today, and still further improvement is expected.

Railroads Return to Private Management

On Jan. 1, 1925, under the terms of an amended agreement with the international committee of bankers, the operation of the roads reverted to private management, the advantage of unified control of the main trunk system being retained. Although the rates that have prevailed are in many instances far higher than the maximum allowed under the terms of the various original concessions under which the roads were built, it seems evident from the statements of Señor Pani that the government has no intention of insisting on reversion to the rates specified in the charters. In all probability this would mean early bankruptcy, financial reorganization, and poor railroad service. As a matter of fact, an upward revision in rates was put into effect, on Dec. 25, just before the return to private operation, and the tax or surcharge of 10 per cent is retained.

With a gradual growth in the volume of traffic; with a reduction of operating expenses by virtue of the

Table IV—Comparative Freight Rates on Mine Products in Mexico and the United States

Material	Value in U. S. Currency	Points in Mexico	Distance, Km.	Rate, Pesos per Metric Ton	Distance, Miles	Rate, Dollars per Ton	Rate, Cents per Ton-Mile
Zinc ore or concentrate	$45	Freanillo—Tampico (*a*)	819	9.02	509	4.10	0.80
Zinc ore or concentrate	45	Charcas—Tampico (*a*)	550	7.93	342	3.61	1.05
Lead ore or concentrate	45	Zacatecas—Monterey	800	10.75	496	4.88	0.98
Zinc ore or concentrate	45	Zacatecas—Torreon	431	7.20	268	3.27	1.20
Lead ore or concentrate	45	Zacatecas—Torreon	431	8.65	268	3.93	1.47
Lead ore or concentrate	22.50	Zacatecas—Torreon	431	7.20	268	3.27	1.20
Lead bullion	500	San Luis Potosi—Chihuahua	1,124	11.91	700	5.42	0.77
Lead bullion	500	Durango—Monterey	622	9.90	386	4.50	1.16
Lead bullion	500	Monterey—Tampico (*a*)	519	9.38	322	4.26	1.32
Blister copper	500	Valardena—San Luis Potosi	748	10.49	464	4.77	1.03
Blister copper	500	Valardena—Tampico (*a*)	1,192	11.60	740	5.28	0.71
Blister copper	500	Saltillo—Tampico (*a*)	628	9.90	390	4.50	1.15
		Points in United States					
Ore or concentrate	45	Telluride, Colo.—Durango, Colo.			130	5.50	4.24
Ore or concentrate	45	Johannesburg, Calif.—Humboldt, Ariz.			460	5.50	1.20
Ore or concentrate	45	Hazen, Nev.—Salt Lake, Utah			510	5.30	1.04
Ore or concentrate	45	Burke, Idaho—East Helena, Mont.			255	3.50	1.37
Ore or concentrate	22.50	Burke, Idaho—Eash Helena, Mont.			255	2.90	1.14
Lead bullion	.....	Denver, Colo.—St. Louis, Mo.			869	9.00	1.04
Lead bullion	.....	Murray, Utah—St. Louis, Mo.			1,265	9.00	0.71
Lead bullion	.....	Joplin, Mo.—St. Louis, Mo			332	3.50	1.06
Blister copper	.....	Copperhill, Tenn.—Laurel Hill, N. Y.			795	10.80	1.36
Blister copper	.....	Garfield, Utah.—San Francisco, Calif.			810	5.85	0.72
Blister copper	.....	Anaconda, Mont.—Tacoma, Wash.			770	7.09	0.92

(*a*) When the destination is Tampico station a handling charge of 2 pesos per metric ton on lead and blister copper and 2.5 pesos on concentrate is imposed to deliver a short distance to ship side. This is a port charge, but part of it probably should be added to the freight.

presumed greater efficiency (or lesser inefficiency) of private management; and with a possible additional reduction to be gained by a downward readjustment of the wages of railroad employees, it is conceivable that net operating revenues may be increased. Holders of railroad securities are, however, entitled to something in the way of return on their investment. Without attempting to analyze a complex railroad situation, it rather looks as though reduction of freight rates was something to be hoped for rather than a prospect for early realization.

Mexican miners in a stope at Pachuca

Pneumatic drills and carbide lamps are typical of Mexican mine operation in spite of the so-called cheapness of labor.

Rates are generally described as "extremely high." I have shown in Table IV a number of typical existing rates on ore and concentrates and on pig lead and blister copper in the United States and likewise the recently increased rates on similar products carried over approximately the same distances in Mexico. To permit a comparison, the last column shows each rate reduced to cents per ton-mile. The data in the table are not conclusive, but the comparison does not support the contention that the Mexican rates, even with the recent increase, are exorbitant.

Few Companies Have Employed *Responsibles*

Responsible Engineer—The law regarding the employment of a responsible engineer (*responsible*) provides that in connection with any mining operation in which fifty or more workers are engaged the management shall have on its payroll an engineer who shall have obtained a certificate as to his qualifications from certain officials at Mexico City. The object of the law, frankly, is to provide lucrative employment for a large number of young engineers of Mexican birth. Some foreign engineers have qualified under the prescribed regulations, but it is difficult to do so even for the most successful mining engineer, and very few have done it. As a matter of fact, the number of Mexicans who have qualified is probably insufficient to permit the law being put into full effect.

However, only a few of the companies have complied with the law, and there are certified men available for the next group that might decide to employ them. The companies which do employ *responsibles* usually place them in the welfare or safety department, either in direct charge of the work or as assistants. One of the specified functions of the *responsible* is to answer to the government for the well-being and protection of employees. At at least two good-sized properties, I know of satisfactory results from the employment of a Mexican engineer in full charge of the safety department.

For the most part, however, the claim is made that competent men are not to be had; that applicants want 600 to 800 pesos per month; that they would be of no value to the company, but would, on the contrary, tend to demoralize the organization. Moreover, the company on general principles declines to accept any dictation as to whom it shall employ.

In many instances fines have been imposed for failure to comply with the law. Serious accident is frequently made the occasion for a large fine, on the ground that it would have been averted if a *responsible* had been at hand. The law has been in existence about two years, but no concerted effort has yet been made to enforce it. If an adequate number of men qualify for the positions it is likely that the government will take determined steps toward enforcement.

In justification of the government it may be said that associations of engineers in the United States are working earnestly to make it obligatory for both public and private employers in the United States to select their men exclusively from licensed groups. There are, in fact, laws that specify that none but a registered engineer shall be engaged to take charge of certain kinds of work. In theory the Mexican government seems to be in an unassailable position; from a practical standpoint the attitude taken by the companies is understandable.

Official Corruption — Recently, the following was printed in the New York *Evening World* as purporting to come from a member of the Congress of the United States. "As a Congressman . . . I have accepted favors that were wholly legal, but which I would hesi-

14 of the Constitution of 1917 begins: "No law may be retroactive to the prejudice of any person." Unless this provision is ignored or evaded—and the Mexican officials deny any intention to ignore or evade it—the present pending law cannot ultimately injure owners of mines or of shares in mining companies if the properties or rights involved were acquired prior to 1917.

The law, which originally was proposed by President Calles last October, is designed to put into more effective operation provisions of Article 27 of the Constitution of 1917, which (a) prohibits the acquisition by foreigners of "direct" ownership (*dominio directo*) of lands and waters within a zone 100 km. wide along the international borders and 50 km. wide along the seacoasts; and (b) grants to foreigners the right to acquire "full ownership of lands, waters, and concessions for the exploitation of mines, waters, and mineral products" in other portions of the republic than the "forbidden" zone, if they shall consent to consider themselves with respect to such holdings as Mexican citizens, and pledge themselves not to invoke the diplomatic protection of their own governments. They are not asked to renounce their own nationality or urged to become Mexican citizens.

Any individual or company that has made any acquisitions since 1917 presumably was fully aware of the provisions of the Constitution; and if they were not complied with, no fault can be attached to the Mexican Government.

During November of 1925 the measure was debated in the Chamber of Deputies, or lower house, and as a consequence of some criticism on the part of prominent Mexican officials and others, President Calles introduced a modified draft of the "project," from which some of the more drastic provisions had been removed. In this form it has passed both houses.

Law Deals Most Rigidly With Agricultural Land

The law is much more strict with respect to property intended for agricultural purposes than for metal mine exploitation. One Mexican citizen explained to me the attitude of the Mexican Government—and the feelings of the people, I believe, are accurately reflected—in this way: "Suppose a large section of northern Sonora and Chihuahua lying south of the border were to be acquired and colonized by farmers who were citizens of the United States. This situation would create the possibility at least of a severance from Mexico much like that by which she lost Texas." The apprehension of some such eventuality as this is said to be the underlying reason for the creation of the forbidden zone and the enactment of stringent foreign ownership laws, particularly with respect to farm lands.

The exact interpretation of the law is a matter for the proper authorities to decide. Conceding, however, that the owners of agricultural land may have more serious cause for complaint, it is difficult to see further burdens for foreign mining interests than the following —and then only in respect to property or rights acquired subsequent to 1917: (a) Disability of a foreigner either as an individual or as a shareholder in a Mexican corporation to acquire "direct" ownership of land and waters (mining concessions obviously are excluded in this classification) in the forbidden zone. That some entirely legal arrangement can be made for the use of such land and water as may be necessary for mining and ore treatment purposes seems likely. (b) Resignation of protection from his own government by a foreign mine operator or the shareholder in a Mexican corporation engaged in mine exploitation. At first thought this might seem to be important because of the large number of shareholders and the large volume of transactions in the shares on foreign stock exchanges. As a matter of fact, the companies whose shares are traded in extensively either already are, or can readily be converted into, foreign holding companies, so that from this "mechanical" angle little trouble need be expected. From the other angle, the waiving of his right of appeal for protection to his own government by a foreigner assumes importance only if and when the courts of Mexico fail to accord justice to foreign interests.

A government, for example, feels under obligation to "protect" its subjects who may have interests in foreign countries only in the event of the *denial* of justice in such foreign country. Some foreigners have expressed the opinion to me that the federal courts of appeal in Mexico are of high standard. Whether that be so or not the fact is that none of the foreign mining companies operating down there have found frequent need for appealing legal controversies to their home governments.

THAT a strong nationalistic spirit exists in Mexico is not to be denied. This has found expression in the recently passed "foreign ownership" laws. On the face of them these laws seem antagonistic, but unless they are made retroactive, no exception can be taken to them. With respect to the metal-mining industry they probably are not so serious as many people are led to believe.

On the other hand, not a few Mexican officials feel that on some occasions foreign governments, at the solicitation of oil companies and other big interests, have taken advantage of the unfortunate internal situation in Mexico to press demands that they would not have thought of pressing against a stronger country. This they resent.

In any event, there is no denying that the government, from President Calles down, and many intelligent private citizens, would like to see exploitation by foreign capital displaced by enterprise financed by Mexicans in whatever degree is possible. Canada feels exactly the same way toward capital from the United States, and open resentment against the "encroachment" from the States frequently is expressed. Some believe that President Calles would not on his own initiative propose a law that will tend in some measure at least to discourage the entrance of new foreign capital. They say that he is like any other successful politician: he must pay reasonable regard to the desires of those to whom he is responsible for being in office. Others say the law represents his sincere personal views.

Establishment of Central Federal Bank

This is a rather formidable array of conditions and tendencies that are causing apprehension. Before attempting to summarize the situation I will draw attention to a few facts that are not directly concerned with mining but that are of peculiar significance, nevertheless.

On Sept. 16, 1925, the government formally established a new bank of issue known as the "Banco Mexico, S. A." The authorized capital is 100,000,000 pesos, of which the government has subscribed more than 51 per

tate to try to explain to my constituents. I have augmented my income by playing the stock market on friendly tips, and by borrowing money that I am going to have a hard time to pay back."

The reading of this passage reminded me of the remarks of one mine manager of the many in Mexico to whom I propounded the question "How serious is this matter of official corruption? Do you have to distribute material sums to keep the officials, local and state, in a friendly and helpful attitude toward your operations?" His reply was substantially as follows:

Gratuities, Contributions, and Loans

"I will say this much: I frequently give small gratuities to various officials in recognition of prompt and satisfactory service; as for example to a certain local railway official when he sees that I get empty cars when I need them. Also, I make fairly liberal contributions—entirely aside from regular taxes—to funds that are collected personally by various officials of the *pueblo* (the community in which most of the mine workers live) and to some other worthy causes. Frankly, I make no attempt to oversee the disbursement of these funds. Nor do I know that any books are ever kept. I have also made 'loans' for which I have no notes, and which may never be repaid.

"Up on the other side of Rio Grande the mining company goes into politics (which means spending money for speakers, advertising, smokers, entertainment, election workers, and similar expenses) and elects a man it wants for mayor. Down here I never interfere in the slightest in elections, but I make a friend of the mayor. The result is the same. Up north the mining company gives the favorite nephew, newly married, of a member of the Industrial Accident Commission a nice job in its general office; down here I cultivate the good graces of a corresponding official in a different way. All that either of us wants is fair and sympathetic treatment.

"We may be a few days behind with the news, but we read the *New York Times* every day, just the same. Whenever any one mentions official corruption to me I think of what we have read during the last two or three years. I recall Mr. Sinclair, who paid the young brother of a prominent government official $1,250 per month for work for which he was entirely unfitted; and I can't but think of some of the monthly expenditures of 12½ pesos that I make. I recall Fall, and Daugherty, and the War Veterans' Bureau, and the revelations of Mr. Couzens as to the million dollar tax rebates to rich corporations, and the comfortable berths in which many of the gentlemen who recommended those rebates landed. I recall the Governor of the sovereign State of Indiana, and the Governor of Illinois, and I smile at some of my friends who hold up their hands with pious horror at the so-called official corruption in Mexico. Some of the governors down here doubtless have looted the treasury; but all the funds that have been taken since 1922 would not approach what either one of these American governors got away with.

Official Fraud on Both Sides of Rio Grande

"The differences between official bribery north of the border and south of it are these: To the north it is more carefully concealed; methods are more circuitous, more subtle. The purpose is to ease the consciences of the bribe giver and taker; or, what probably is more important, to afford means of keeping them out of jail if they are caught. To the north not only is there petty bribery as to the south, but matters involving millions of dollars are arranged by bribery. Not only minor officials but very high ones are subject to bribery up there."

The man I have been quoting is an excellent manager. He accepts the situation as he finds it. He charges his various disbursements for gratuities and contributions as part of the cost of operation. He is sure that his net cost is lower this way than if he did not thus "smooth" the road. He happens to be a man who speaks the language very fluently, who knows intimately the men he is dealing with, and who is favored by being in a comparatively isolated district where outside influences are not strong.

On the other hand, the manager of another large company told me that about two years ago everybody concerned was given to understand that not one peso was to be paid to any one in behalf of the company without a full and truthful voucher. This policy was carried out in the spirit as well as to the letter, and no payments, either direct or indirect, have been made for official favor. This man told me that the harm was not so much in the amount of money involved in these "hand-outs," as in the demoralizing effect on the organization. There was always gossip. Moreover, he had to devote a lot of personal attention to petty matters, and, of course, he did not know when demands would be increased. He suspected that the company had been subjected to various inconveniences, to severe inspections, to fines, to labor demands, possibly to some tax burdens that might have been avoided; but he is more than satisfied with the present scheme. "If we can't operate profitably with everything open and above board, we'll shut down," is the laconic way he puts it.

Naturally, I found aversion to the subject; it is not a nice one to talk about. However, generally speaking, there is a lot of petty bribery, direct and indirect, in Mexico. Such mining companies as practice it dislike it; the system is a bad one. There is nothing to stop officials from gradually increasing their demands to "what the traffic will bear," so that even from a purely money standpoint the thing is dangerous.

If and when these demands become exorbitant there should be a "showdown." Indeed, there may be a showdown before then. Bribery cannot exist where there are no bribe givers. If all those who are operating mines in Mexico should so decide, bribery in the mining industry would be stamped out. If you ask a manager why he does not simply quit paying, the chances are he will reply, "When in Rome do as the Romans do."

Article 17 on Retroactive Force of New Laws

Laws Averse to Foreign Ownership—That a strong nationalistic feeling exists in Mexico is not to be denied. With the philosophy "Mexico for Mexicans" no one can quarrel, so long as existing rights of foreigners are not jeopardized. If Mexico desires to pass a law prohibiting a foreign citizen, or a corporation in which a foreign citizen holds any portion of the stock, from acquiring property or concessions of any description, not only is she within her rights, but she has ample precedent in international law.

Those people who are making the most fuss over the foreign ownership law passed by both houses of the Mexican Congress, and now only needing promulgation by the president to become effective, seem to overlook the following unequivocal declaration with which Article

are half a dozen different views, but I will try to give a composite opinion, for what it is worth. When I say that the average manager is cold-blooded in sizing up the situation, I do not mean that he thinks less of the health and safety and comfort of his employees than operators elsewhere; but he figures things out in dollars and cents. He looks with apprehension at some of the tendencies that have been outlined in this article, but he takes them as part of the "game." As one man explained it "In British Columbia you run the risk of disastrous snowslides, of frozen water systems, and of disrupted transportation. That must be figured in the cost of operation. Down here we have none of these to think about or to provide for, but we have burdensome labor laws, official corruption, and increased taxes. These are elements in the cost of operation just as snowslides are in British Columbia." Incidentally, it may be remarked that the tax question is a sore one in British Columbia. The provincial and dominion income taxes together total more than 20 per cent, a fact which I did not know when I had the conversation recorded above. The consensus of opinion seems to be that excesses in respect to the demands of labor and to taxation are to be expected; but that an adjustment necessarily will be reached which will be fair to all concerned. How soon that will be few venture to predict. In connection with the extensive exploration and development work being done —mostly by the companies long established in Mexico—one point is significant. In arriving at an estimate of the cost of operation, on which to base a decision as to exercise or abandonment of an option, a large factor of safety must be allowed for possible increased labor costs and higher taxes. Indeed, the possibility of another revolution, even though not imminent, is figured into the estimates of cost of operation. In other words, though an enterprise now producing may be able to bear additional burdens without actually losing money, the prospective enterprise, on which a good profit must be in sight to warrant the necessary investment for large-scale equipment, may die in its cradle as a consequence of foreseeing these identical burdens. In the same way many view the foreign-ownership law merely as a source of possible added expense or perhaps loss that must be provided against. It is an additional hazard that increases the risk rate. The continued expansion of the industry by foreign capital will stop automatically when the point is reached where a fair return cannot reasonably be anticipated. An ore deposit that would be snapped up in a minute in the United States easily may go begging in Mexico. This is something for the Mexican Government officials to ponder carefully.

IF MEXICO desires the further development of her rich mineral resources she must have financial and managerial aid from the outside. However, the inward flow of foreign capital automatically will cease if conditions become such that adequate profit is not reasonably assured. Burdens or potential burdens of every kind must be taken into account by companies contemplating the establishment of new enterprises in the republic

It should be emphasized that despite the existence of differences of opinion and numerous contentious matters, the relations of most of the mining company executives with the government officials, local, state, and federal, and even with most of the labor leaders, are generally cordial. The local manager, if he is to be successful, must be tactful and diplomatic. Like any other human being, the Mexican resents having his views ignored or ridiculed. The wise manager uses persuasion rather than bullying. He is patient and does not rush matters. He listens to the views of the Mexican, but he tries to show him where he is wrong, if a difference of opinion exists; and as a rule the Mexican is as reasonable, or perhaps one should say no more unreasonable, than the average human being. Even if the views cannot be reconciled, there is no sense in making a personal quarrel out of a business disagreement. For the amicable relations existing between all but a few of the operating companies and the government officials the representatives of the companies are entitled to great credit. The maintenance of these relations is part of their job; and they are doing it exceptionally well.

The one thing that every mine operator seems to dread—as much as these philosophical gentlemen can be said to dread anything—is another armed revolution. And the opinion seems to be general that the chance for a long period of orderly government is good. So far as general order and safety to property and life is concerned, no complaint is made. Engineers are continually traveling in the old hotbeds of revolution and banditry with no thought of molestation. That there are factions that are quite willing to start trouble with the present government many are convinced; but money is needed to pay soldiers and to buy munitions, and money is not easy to get. The action of the United States Government in supporting President Obregon in the de la Huerta uprising in 1923 is credited with being a strong factor in the survival of Obregon, and indirectly in the subsequent election of Señor Calles as his successor. I feel sure that most mine operators would make the best of the foreign-ownership law, rather than have Washington break diplomatic relations with Mexico as a measure of coercion. The impression prevails that foreigners who are most disturbed over the pending ownership laws are those whose positions are pregnable. It is known that some foreign interests have been guilty of various high-handed performances, and that they have exploited lands to which their title is not clear. To the credit of virtually all metal-mining companies, their hands are clean in this respect. When someone's rights have been denied conclusively, Washington should take action; but it seems certain that the withdrawal of the support of the United States would seriously threaten the stability of the present government. Whether a violent revolution were to be precipitated or not, any such action on the part of the Washington government certainly would incite the ill-will and enmity of the substantial citizens of Mexico. Americans all seem to regard President Calles as a strong and forceful leader, and his government as substantial and able. His task has been more difficult than the outsider knows; but he has made progress. They have every hope that the only peaceful election since Diaz (that of Calles) may be the first of several.

Mexico is a country of vast mineral wealth; she needs aid from the outside to exploit it effectively. The Mexican people deserve a share in the profits; so do the foreigners who supply the money and the management. Only a pessimist can fail to believe that a fair basis for further development and exploitation, and for dividing the profits, will be reached.

cent. The general public is also invited to participate. There seems to be some doubt as to whether the capital paid in by the government is actual surplus income or whether it is only apparent surplus. Nevertheless, the bank is headed by conservative bankers and the by-laws prescribe limitations on note issues and loans that should assure sound banking. It is hoped to keep politics out of the bank administration. The bank already has issued a limited amount of paper currency, redeemable in gold, that is gradually being put in circulation at par in many parts of the country. The rehabilitation of Mexico's financial system is a matter that, of course, will require years; but the establishment of the new bank on a sound basis is a step in the right direction. If properly administered it should make capital available for legitimate enterprise and should help make the country prosperous.

A second project that ought to make for general prosperity is a motor-road building program under which a well-known firm of Chicago contractors is spending 1,000,000 pesos of federal funds monthly. The money is coming from a special tax on gasoline; it is to be spent for asphalt-surfaced roads with concrete base to connect Mexico City with the following points: Pachuca, Puebla, Acapulco, Tampico, and Laredo, on the Texas border. Incidentally, the Southern Pacific railroad company has almost finished the final link in its line from Tepic to Guadalajara, where connection will be made with the National lines to Mexico City. This will open for the first time a direct line from Nogales, Ariz., through the states of Sonora, Sinaloa, and Tepic to Mexico City. So far as the mining industry is concerned this will be of little direct benefit, but the expansion of the communication systems of the country both by highway and railroad is an excellent indication.

Repeal of Agrarian Laws

One of the most encouraging recent developments has to do with the pending revision of the agrarian laws. It is significant because it marks the realization on the part of the lawmakers, (1) that statutes must be practically as well as theoretically workable and (2) that capital is an essential element in the exploitation of natural resources in any country. Certainly these are elementary principles; but the Mexican legislators—like many others—ignored them in drafting their agrarian law. As framed, the law is supposed to operate like this: The agrarian inhabitants of a *pueblo*, having no land of their own to till, take steps to acquire a portion of the adjacent *hacienda* or plantation. The government appropriates a tract on which a crop is ripening and reimburses the landowner with special bonds. These being acceptable as payment for taxes, are marketable at a small discount with oil companies and other large taxpayers. The agrarians get possession of some land, and the *hacienda* owner is paid for the acreage he surrendered. This looks very smooth indeed.

In practice the first difficulty arises in arriving at a fair price for the land. Invariably the government must confiscate the land, and then the matter of compensation drags along in the courts. The agarians, of course, are in possession. They harvest the crop and realize such profit as they can. The next season they find that they have no machinery with which to till the land; and that they have no money with which to buy machinery or even seed. Even if they had money the chances are they would not have sufficient technical knowledge of farming to enable them to plant and raise a crop. The agrarians may abandon the land, but the former owner is in no mood to put in another crop, of which he may be dispossessed again on terms that are not satisfactory. In fact, he is likely to let additional land lie idle when it is uncertain whether he will ever be able to harvest his crop. This is a typical situation. The inhabitants of the *pueblo* are no better off, and the country at large is worse off because of lessened production. It is safe to say that the agrarian laws account in a large measure for the huge acreage of fertile land that has been left uncultivated in the last year or two. They account for the serious shrinkage in the production of various food crops in the republic. I have been assured that the federal congress realizes that the agrarian laws are a failure and that they will be modified. If this is so, the fact seems highly significant to the mining industry.

Two Extreme Views of Propagandists

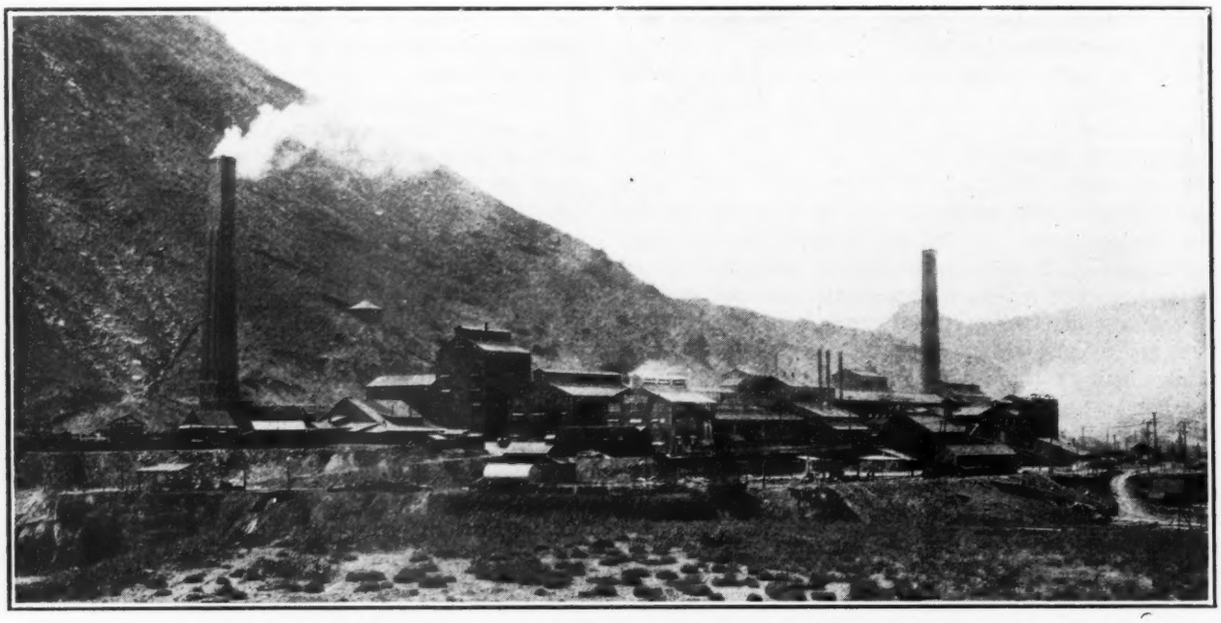
Two pictures of Mexico are painted by propagandists in the United States. One shows a country the agriculture and industry of which have been "ravaged by communism"; which "slams the door" in the face of foreigners who would develop the resources of the country; and which refuses justice to the foreigners who are already engaged in industrial enterprises. The other shows a country in which both the people and officials not only welcome but seek the aid of foreign capital for industrial development; in which there is an utter absence of "radicalism" in official circles; and in which every assurance of protection and encouragement is given to foreign enterprise.

Neither is entirely accurate, but the latter, I believe, gives a more nearly correct impression. Communism is not by any means a serious menace; but the government may certainly be described as radical rather than conservative. Justice is not being refused to foreigners operating in the country; but, on the other hand, no great incentive is being given new capital to enter the country.

The attitude of the government seems to be this: It realizes the value of its mines and other natural resources. It knows that the Mexicans have neither the money nor the managerial nor technical ability to develop these resources, but it feels that outsiders can and should pay well for the privilege of exploiting them. This, Mexicans believe, is justification for increased taxation, and for radical provisions in the labor laws. A natural envy is aroused by the enterprise of foreigners that is making big profits from the exploitation of Mexico's resources; but the antagonism is not sufficient to cause the slamming of the door in the face of outsiders. Even the foreign ownership bill, except for the forbidden zone, only insists that foreigner mine operators take their chance in the Mexican courts in any dispute involving newly acquired rights.

The federal government on at least two occasions during the last year has stepped in and settled disputes that threatened permanently to shut down big mining enterprises. And, as I have pointed out, the failure of the agrarian law is admitted, and changes are likely to be made. This indicates level-headedness in the present government and refutes the idea that Mexico is drifting toward demoralization similar to that that has harmed Russia so much.

What is the attitude of the mining industry? There



General view of the Durango plant of the American Smelting & Refining Co.

The Durango Lead Smelter and Sulphating Plant

Roasting and Leaching Process for Lead-Zinc Concentrate Continues Promising, but Much Experimental Work Is Still Necessary

By Edward Hodges Robie
Assistant Editor

SOUTHWESTERN COLORADO is the source of practically all the ore received at the Durango lead smelter of the American Smelting & Refining Co. Situated on the narrow-gage line of the Denver & Rio Grande Western R.R., the ore supply is practically limited to the mines served by this railway; otherwise, reloading would be necessary. At present, the material smelted comes from the Sunnyside mill, at Eureka, near Silverton; from the Tomboy and Smuggler Union mills, near Telluride; from two small shippers near Ophir; and the remainder is made up of occasional small lots of crude ore from various sources. Practically the entire receipts are now flotation concentrates, which fact has added to the importance of the roasting and sintering departments of the smelter.

The smelter is favorably situated on the Las Animas River at the southern end of the town of Durango, alongside of the D. & R. G. W. tracks. Right at its back door, and owned also by the A. S. & R., is a good supply of bituminous coking coal, so a coke plant forms part of the smelter. This coal and coke is sold to a small extent for local consumption, and a larger market for it only awaits better transportation facilities to the Coast.

Metallurgists have had their attention attracted to the Durango smelter in recent years by the innovation of sulphate leaching of lead-zinc sulphides by the so-called Coolbaugh process. It will be the purpose of this article to tell a little of what has been accomplished recently in this interesting department of the plant, but first I shall describe briefly the smelter proper, supplementing the data given in Arthur B. Parsons' articles in *Mining Journal-Press* of Jan. 10, 1925, and May 30, 1925.

About 200 tons of concentrates per day are now being received. This material comes in box cars, from which it must be shoveled by hand into wheelbarrows and dumped into bins, a procedure somewhat costly, but which it does not seem wise to improve, considering the small scale of operations. Freezing causes much trouble in winter, and it is sometimes necessary to put shots in the cars. The ore is bedded in bins according to where it is to be used. Particular care is taken in the securing of samples, both for moisture and metallic constituents, as is proper in a custom plant, and careful checking has confirmed the accuracy of the methods used.

The smelter has considerable zinc to contend with in its lead concentrates, and every effort is made to drive off as much as possible before it reaches the blast furnaces. Concentrates high in zinc and generally over 20 or 25 per cent sulphur are trammed by hand to Godfrey roasting furnaces, of which there are ten. In a new plant these would be displaced by a couple of multiple-hearth furnaces. The Godfreys roast the sulphur from 20 to 35 per cent down to about 12, the product being a component of the charge to the sintering machines.

Three standard Dwight & Lloyd sintering machines are now in use, and it is planned to install a fourth. One of these handles about 115 tons a day of what is known as a pre-sintering charge, made up of about 65 per cent of calcines from the Godfreys, 22 per cent of returned fines from the other two D. & L.'s, and 13 per cent raw sulphide concentrates. The charge is assembled on a belt from various bins, and elevated to the charge hopper. Sulphur is reduced to about 7 per cent in the product of this first machine. The other two D. & L.'s are locally known as "second-over"

machines. Their charge is made up as follows: 30 per cent crushed sinter from the first machine, or "pre-sinter"; 40 per cent Godfrey calcines, of "pre-roast"; 10 per cent flue and Cottrell dust; 10 per cent raw sulphides; and 10 per cent blast-furnace slag, usually granulated. This last is added solely as a diluent to improve the physical condition of the bed and thus increase desulphurization. The use of the "pre-sinter" also improves the physical nature of the charge. No coarse table concentrates are available any more. The final sinter contains from 3½ to 4 per cent sulphur and is sprinkled with water just before discharging from the machines and also in the blast-furnace charge cars. The moisture keeps down dust and prevents the top of the furnace from getting too hot.

One large blast furnace, 44x224 in., and two small furnaces, 44x144, are available, though only the large one is commonly used. These have thimble tops with the exception of one of the small ones. The large furnace is 29 ft. high from the tuyères to the feed-floor level, though the thimble top extends down 6 ft., leaving 23 ft. effective height. The large furnace has fourteen tuyères on a side; the small ones have nine. Blast pressure varies from 26 to 38 oz.

The charge to the furnace is made up of 90 per cent sintered ore and 10 per cent lime rock in 6- or 8-in. lumps. To this is added 25 per cent returned slag shells, and on this total charge, about 12 per cent coke (85 per cent fixed carbon) is used. The furnace charge will assay about 25 per cent lead, 1 per cent copper, 1 oz. gold, 25 oz. silver, and 9 to 10 per cent zinc per ton. The bullion, tapped from the lead well at the side of the furnace, contains about 4 oz. of gold and 100 oz. of silver; it is drossed, the dross re-smelted, and the clean bullion shipped to the Omaha refinery.

The matte fall amounts to about 8 per cent, sufficient to take care of the copper and prevent crucible troubles. It is concentrated to about 40 per cent and shipped to the Garfield smelter. The slag runs about 13½ per cent zinc, 22 per cent silica, 41 per cent iron and manganese oxides, and 11 per cent calcium oxide, magnesium oxide being only a few tenths of 1 per cent. Zinc is plainly high and a zinc mush is troublesome in the furnace operation. To combat the zinc, as much roasting as possible is done before the ore enters the blast furnace, high coke is carried, and an irony slag.

Blast-furnace and roaster gases are passed through a Cottrell treater of the pipe type. Heretofore, sulphuric acid has been used for conditioning the gases, but experiments are now being done with water sprays. Successful operations depend on getting the water fully atomized and reaching all parts of the gas flow with the atomized water. The gases cannot be cooled too much on account of interfering with the stack draft, as no fan is used.

Now, as to the sulphating plant. The principle of operation is well known—the novelty consisting in roasting the zinc sulphide to zinc sulphate, which is leached out in water, leaving a lead residue for the lead smelter; and evaporating the zinc sulphate solution either with or without purification, to form dry powdered zinc sulphate. The question naturally arises, after two or three years' experimentation, is the process a success? Will more plants be built? It is still too soon to give a definite answer. As now operating, and if expenses for experimental work were suspended, the plant would probably somewhat more than pay its way over a term of years. Experimental work is, however, still necessary, particularly in working out the application of the process to a variety of ores. For example, on the Black Bear concentrate as much as 87 per cent of the zinc was made water-soluble, but that ore became no longer available, and on the Sunnyside middling now being treated, 70 per cent is about the best that has been done so far. Mechanically, the roasting and leaching parts of the process have been pretty well perfected, but the drying feature of the process is not altogether satisfactory.

Roasting is done in an eight-hearth furnace, 20 ft. inside diameter, with inclosed drying hearth, designed by L. B. Skinner and built by the Colorado Iron Works. Unlike the ordinary multiple-hearth furnace, the brickwork is not completely inclosed in sheet steel, though steel bands encircle the furnace at the hearth levels for support. Around the lower part of the furnace, sheet asbestos is wrapped to conserve heat. The central shaft is of cast iron, supported on Timken roller bearings and revolving on vertical rollers at the top. The charge to this furnace is about thirty tons a day, the gases passing downward through the furnace along with the charge, after being preheated in the rabbling arms.

Temperature control is, of course, important, and records are kept of the temperature in the bed of each hearth as well as of the gas space immediately above, permanent installations of thermocouples being provided. Recording pyrometers, of Brown make, are used. Characteristic temperature readings follow:

Temperature, Degrees Centigrade

	Hearth No. 1	2	3	4	5	6	7	8
Gas	515	520	565	610	640	615	640	550
Hearth bed	470	530	560	610	615	630	570	330

The chemical reactions in the furnace are complex and cannot be described accurately in a few words. The sulphides of iron, lead, and copper are more readily roasted than those of zinc, and are quickly oxidized to oxides and sulphates. The ferric oxide formed acts as a catalytic agent, changing part of the sulphur dioxide to the trioxide. This, together with the sulphates, reacts with the zinc sulphide on the lower hearths of the furnace, forming zinc sulphate. That is roughly what goes on. The formation of insoluble zinc ferrites must be prevented so far as possible.

Steam is used for cooling the second or third hearth; it is preferable to air, as it does not dilute the gases. A water spray may be substituted. Air is introduced on the third or fourth hearth.

The amount of water-soluble zinc in the material on each hearth is about as follows:

	Hearth No. 2	3	4	5	6	7	8
Water-soluble zinc, per cent.	3.2	4.4	6.6	9.3	12.8	13.9	14.3

On the material being treated, 14.3 per cent of water-soluble zinc corresponds to about 70 per cent of the total zinc.

The calcines are screened through a Traylor electrically vibrated screen, lumps larger than 10 mesh being reground in a small ball mill. Fine hot calcines are then agitated in Pachuca tanks with weak solution. Agitated pulp temperature is about 60 deg. C. and the dilution is about 1½ solution to 1 solids. The temperature is near that of the maximum solubility of zinc sulphate and is sufficient to prevent basic sulphates from forming. Ferrous iron in the calcine is oxidized to the ferric condition.

From the Pachuca tanks, the pulp passes to a 30x9-ft. Dorr thickener for leaching. Sufficient zinc oxide is left in the roast to precipitate the copper. The pulp underflow from this tank, consisting of 1 part solution to 2 parts solids, is thinned with water and pumped to a second thickener, from which the pulp goes to an 8x12-ft. Oliver filter, where the moisture is reduced to about 25 per cent in the filter cake. This cake is added to the charge to the sintering machines for smelting in the lead blast-furnaces. It contains, when dry, from 13 to 16 per cent total zinc and 1 to 1½ per cent of water-soluble zinc. The filtrate is returned to the second thickener.

Overflow from the second thickener forms the weak solution (sp.gr. 1.14) for agitation in the Pachucas. That from the first thickener is the clear, strong solution (sp.gr. 1.35), from which the zinc sulphate is to be removed. It is treated with zinc dust to remove cadmium and the small trace of copper that is present; also with potassium permanganate for the removal of manganese. Then it passes to a spray drier for precipitation as a dry powder.

Constructional Detail of Spray Drier

Extraction of a dry solid from a solution is a difficult problem at best, though it is being done satisfactorily in certain industries, as in the preparation of desiccated milk. When the solution is of a corrosive nature, however, the difficulties are multiplied. The spray drier in use at Durango is a rather elaborate mechanism and is the most troublesome part of the sulphating plant. It consists of a large hopper-bottomed chamber in which hot air circulates and in which the solution to be evaporated is sprayed. Most of the zinc sulphate is deposited in the bottom of the chamber, from which it is removed by screw conveyors.

The spray drier used was one of the first made by W. L. Fleisher & Co., of New York (since absorbed by the B. F. Sturtevant Co.), and its shortcomings are to be attributed to lack of operating experience in work of this kind. All fittings are of brass. There are 88 sprays in all, under pressure of air at 17 lb. per square inch. Occasionally these become clogged, this being one of the principal difficulties in the operation of the drier. Hot air is supplied to the chamber at 350 deg. C. by a Sirocco mill type fan, the exit air having a temperature of 120 deg.

Not all of the zinc sulphate is sufficiently fine to fall to the bottom of the chamber, a fact which causes a good deal of trouble. One of the problems waiting a solution here is to atomize the solution sufficiently fine, so that the droplets will dry quickly, and yet to prevent a mist or fog that will result in fine dust particles difficult to settle. Air passing out of the chamber contains a considerable amount of fine dust, which is precipitated so far as possible in a cyclone dust collector, that which remains being removed in a scrubbing tank.

The precipitated material assays about 35 per cent zinc, and so far has found its principal use as a selective flotation reagent, for which it seems particularly adapted.

At the time of my visit, R. P. Raynolds was superintendent at Durango and E. J. Bruderlin was in charge of the sulphating plant. Both of these gentlemen gave me a most cordial reception, and to them I am indebted for the information herewith presented. Recently, R. E. H. Pomeroy has been made superintendent, and Mr. Raynolds transferred to the Denver office.

Importance of Swedish Iron Ore

Sweden's leading position in the international trade in iron ore is discussed in the quarterly report of one of the foremost Swedish banks, says *Commerce Reports*. Taking into consideration the fact that the greater part of pig iron is manufactured in the various countries from domestic ores, and, furthermore, that such countries as Cuba and Chile export ore directly to the operating companies, Sweden appears to supply about 50 per cent of the total quantity of iron ore entering into international trade, which is calculated to amount to about 11,000,000 metric tons of iron content per annum.

Next in importance is the minette ore from Lorraine, exports of which during the first six months of 1925 totaled 5,100.000 metric tons, with an iron content of about 30 per cent. Other important sources of iron ore for export are Newfoundland, Spain, and northern Africa.

Shipments of iron ore from Sweden in 1925 are expected to reach a total of roughly 9,000,000 tons, of which the Grangesberg company will ship about 7,500,000 tons. Swedish ores contain from 60 to 70 per cent of iron, and the bulk of this ore is rich in phosphorus. The value of annual shipments of iron ore accounts for a little more than 10 per cent of the total Swedish export trade.

Swedish iron ore is exported mainly from Narvik, in northern Norway; this port is ice-free the entire year. Other export points are Luleaa, in northern Sweden, and Oxelosund, in southern Sweden. At present the Ruhr uses about 60 per cent of the Swedish foreign shipments. England, Belgium, Czechoslovakia, Poland, and the United States are also important markets.

Extraction of Potash From Greensand

In an article appearing in *Industrial and Engineering Chemistry* (1925, Vol. 17, pp. 1177-1181), abstracted in *Chemistry and Industry*, J. W. Turrentine, C. W. Whittaker, and E. J. Fox discuss the extraction of potash from greensand. Greensand as found in very large quantities in New Jersey has the approximate composition K_2O 6.5 per cent, Fe_2O_3 18.6 per cent, Al_2O_3 5.8 per cent, the residue being silica with small amounts of lime and magnesia. The commercial production of potash from this source depends on the simultaneous production of profitable byproducts.

A process in course of development consists in treating the sand, as dug, with sulphuric acid (density 1.3 to 1.4) at 80 to 90 deg., the necessary heating being obtained by the dilution of the acid. The undissolved residue of silica is washed, dried, and screened, when it has adsorptive properties for decolorizing purposes, being sold under the name "Glaucosil." The solution is readily crystallized by addition of sulphuric acid or evaporation, yielding principally potash alum and iron sulphate. The latter may be decomposed by heating at 500 deg., yielding ferric oxide and oleum. By recovering the sulphates of potassium and aluminum from the residue, crystallizing, and igniting at 900 deg., the aluminum sulphate is similarly decomposed with production of alumina.

Another process which it is thought may eventually prove practicable consists in the digestion of the greensand under pressure with lime and water, the final products being caustic potash and building bricks.

Heat-treating Steel Automatically at Langlaagte Estate

Rand Gold Mining Company Using New Machine for Tempering Rock Drill Bits—Perfect Control of Operation Possible

A new machine for heat-treating rock drill steel automatically was described briefly in the Feb. 7, 1925, issue of *Mining Journal-Press* at the time of its introduction to the mining industry by its manufacturer. One of these machines was installed in the drill-shop of the Croesus section of the Langlaagte Estate & Gold Mining Co., on the Rand, South Africa, according to a recent issue of the *South African Mining and Engineering Journal*. The writer tells in detail how the machine is operated.

Its essentials are: (a) an oil-fired furnace whose temperature is controlled automatically by pyrometers and whose temperature is reducing. (b) A quenching bath containing, at the tempering point, a bubble or fountain of water over which each bit is held for a definite time. (c) Speed control, whereby the time of heating, tempering and quenching are varied together, depending on the size of the bit treated—that is, on the volume of steel being handled.

The details of the cycle are as follows: A central column supports a rotating member carrying four arms, which rotate at a uniform speed, controlled by a change-speed lever. These arms push round a number of carriers, supporting the bits over a contoured path. Starting at the feeding end, a bit is inserted into the carrier with its cutting end at a definite level. The carrier is now pushed forward, and drops down the path, inserting a definite length of the steel in the reducing atmosphere of the furnace. There are as a rule ten carriers in this position at a time, exposing bits to the heat of the furnace. Each arm pushes this assemblage forward the width of one carrier, and then travels to the leaving end of the furnace, where it picks up the last of the row and pushes it down a steep path, carrying the bit quickly from the furnace into the water fountain. The depth of immersion of the bit is controlled by the water level, this being adjustable at the outlet. A bit which has spent six minutes in the furnace dwells over the bubble for seven seconds, and a larger steel is given exposures exactly in proportion though longer in duration. The arm now overtakes the carrier at the tempering point and proceeds to push it down a gradual slope, at a uniform speed, thereby increasing the immersion of the heated steel at a uniform rate and quenching it. The quenching period is again proportional, bearing a constant relation to the heating and tempering times. At the end of the quenching period, three fixed arms, carried on a post, lift the bit out of its carrier, and deliver it on to the floor or into a truck placed ready. The carrier is then elevated and pushed to the feeding point and restarts its cycle with a fresh bit.

This machine is entirely self-contained, a 3-hp. motor driving the arms through a change-speed gear box, and also a fan which provides the blast pressure for the oil-burner. Part of the air, furnished by the fan, it should be added, is led to a curved perforated pipe laid on the top of the furnace structure, just behind the arc occupied by the carriers when standing in the heating position. This air is directed across the top of the opening through which the bits pass, and it has the dual function of preventing egress of the products of combustion and of limiting the soaking-back of the heat up the bits. The furnace temperature, which is maintained 150-180 deg. F. above the decalescent point of the steel, is taken by electrical pyrometers at two points, and variations cause the operation of two servomotors, controlling the air and fuel to the burner.

The cycle is so designed as to produce a ⅜ in. case of maximum hardness and density over the cutting and reaming edges when using straight carbon steel having a carbon content of 0.75 per cent or over.

"On seeing this machine in operation, and observing the exact control it gives over the heat-treatment over the bits," says the *South African Journal*, "one is led logically to the desirability of making the whole process of drill-sharpening, including heating for forging, equally exact and automatic. That such a result is likely to follow successful results over a period from the machine described is to be anticipated. Reduction in drilling costs must follow any improvement in stamina in the bits. Thus the developments started by this the first local installation of the machine and system will be watched with great interest by the very wide circle affected by improvements and their effect upon working costs."

Sex in Bolshevik Minerals

Reports from Moscow, recently published in *The South African Mining and Engineering Journal*, announce that a leading Russian scientist, Dr. Manuiloff, has disclosed important evidence suggesting that male and female sex exists among minerals. Dr. Manuiloff is a member of the Psycho-Therapeutic Association in Leningrad, and recently addressed the association on his discoveries. He declared that, after exhaustive experiments, he hopes to prove the existence of one harmonious system of sex throughout the entire creation, from human beings down to stones.

In an interview, the Russian scientist said: "While conducting research work with a view to analyzing sex in human beings, animals and plants, I have stumbled upon evidence which hints strongly at the possibility of sex in minerals. In this work I have reached my findings by employing radioactive tests. My attention was first arrested by the discovery that the same mineral occurs in two varying forms, the one consisting of cubic crystals, the other of octagonal crystals. In these experiments I have made use of the most typical mineral—namely, pyrites.

"When crystallized into cubes pyrite has caused the discoloration of the solution in which it was immersed —a typical male reaction. Crystallized into octagon crystals, pyrites gave a typical female reaction.

"I have repeated this experiment in eleven different minerals and have obtanied the same amazing result in each case.

"I do not dare to affirm that my experiments lead to final and indisputable proof of the existence of sex in minerals. I can only refer to the astonishing evidence, pointing to this possibility," concluded Dr. Manuiloff.

The mineral talc would appear to be one that would form a good basis for work by the Russian authority. Its wide adoption by the female of the human species would indicate that it is probably masculine, a postulation open to proof.

Discussion

"Engineering and Mining Journal-Press" is not responsible for statements or opinions published under "Discussion." In many cases the views expressed are diametrically opposed to editorial policy and belief. Letters will not be printed unless the author's name and address are known to the editor.

Balata vs. Chicle

THE EDITOR:

Sir—The following paragraph near the bottom of the second column on page 525 of my article which appeared in your issue of Oct. 3, 1925, has just been called to my attention:

"Although the Balata Company is not a mining company, balata being a rubber without a snap—*chicle*—obtained from the sap of a forest tree (*Bumelia retusa*)—its transportation problems are similar to those of the mining companies."

The paragraph looked altered and on referring to my manuscript I find that the italicized words were added after you received the manuscript. The interesting feature of the situation is that balata is not chicle.

Balata is the coagulated sap or milk of the bullet tree (*Minusops globosa*) British Guiana. In Dutch Guiana the tree is known as the *melkhout* or *bolletrie* (*Mimusops balata gartnfam sapotaceae*). Balata is used for making belting, women's dress shields, baby pants, and other domestic uses where a thin flexible waterproof membrane without too much stretch is required. The annual export from British Guiana in 1924 amounted to 1,370,212 lb.

Chicle is obtained from the sapodilla tree and is not listed among the exports of British Guiana.

Philadelphia, Pa. LLOYD T. EMORY.

Mining Graphite in Madagascar

THE EDITOR:

Sir—Referring to an article published in the *Mining Journal-Press* of Sept. 26, 1925, under the heading of "Madagascar Graphite Industry Growing," I wish to call your attention to the following points, which are erroneous:

1. The f.o.b. Tamatave price of Madagascar graphite is not quoted on the basis of 65 per cent carbon contents, because no such low carbon graphite is shipped from the colony, but on the basis of 85 per cent.

2. In no case is the cost price of graphite at the mine so low as 75 francs a ton, even for "unwashed ore" with a carbon contents varying from 50 to 70 per cent; under the most favorable circumstances, the cost price of such "unwashed ore" is never lower than 300 francs per ton at the mine.

My aim in this is to help you to give your readers correct information regarding the situation of the graphite industry in this colony.

HEAD OF THE MINING DEPARTMENT OF MADAGASCAR COLONY.

Tananarive, Madagascar.

U. S. Metals Refining Co.'s New Reverberatory Plant

THE EDITOR:

Sir—There were a few minor errors in my article entitled "New Reberberatory Smelting Plant of United States Metals Refining Co." in the *Mining Journal-Press* of Jan. 30, 1926, which you might correct as soon as possible. They were as follows:

On page 197, in the second column, third paragraph, fourth line, it is stated: "The oversize goes to a 21x24-in. Blake crusher. . . ." This should be 12x24-in. Blake crusher.

On page 201, in the first column, third paragraph, second line, it reads: "V-shaped tie rods having an angle of 30 degrees. . . ." This should be: "V-shaped tie rods having an angle of 16 degrees."

On page 204, first column, first paragraph, sixth line, it is stated: "The mixture is about 1 lb. of coal to a cubic foot of free air. . . ." This should read; "The mixture is about 5 lb. of coal to a cubic foot of free air." FRANK R. CORWIN.

Carteret, N. J.

Americans and Common Labor

THE EDITOR:

Sir—Robert B. Dickson's letter in the *Mining Journal-Press* of Jan. 30 was timely. A great many mining camps are in the condition of a neighborhood into which several colored families have moved. The whites already there move out and others, it is highly probable, will stay out.

Any camp that is known as a white man's camp will not have to call on Mexicans or any variety of southern European. The cry about Americans not wanting to do common labor is "bunk," for the truth is there is too much American common labor. But Americans do not want to do common labor along with a bunch of "hunkies" or Mexican laborers.

The companies or their superintendents and foremen brought in the foreigner, not because American labor could not be had, but because they thought the "hunky" would work for less and stand more abuse than the American. But it has turned out that the "hunky," though he is servile, which appeals to a great many bosses, does much less work and asks for and gets more money. Since a people who have little self-respect and regard for their own rights never respect the rights of others, these foreign labor camps are notorious for trouble.

Camps that are peopled with foreigners are pretty well known, and the better class of Americans, especially those with families, stay away if they can. Mining camps in the United States in which an American will feel at home are even now becoming pitifully few. H. L. TURNER.

Victor, Colo.

Consultation

Calculating Extraction in a Zinc-Lead Concentrator

"I would like to have a reliable formula for calculating extraction and recovery of both metals in a zinc-lead concentrator where two products are made. I have been calculating these by quadratic equation. They are tedious and not entirely accurate?"

In the *Mining Journal-Press* of Dec. 12, 1925, is printed the development of a formula of this kind, which according to T. R. Herndon, of the American Smelting & Refining Co., at Santa Barbara, Chihuahua, Mexico, has proved helpful.

In nearly all mills it is possible to get a fairly accurate flotation head sample, a lead concentrate, a zinc concentrate, and a final tailing. Without giving the algebraic proof, the following results are reprinted.

Let:

L = assay of lead in feed; Z = assay of zinc in feed;
L_1 = assay of lead in lead concentrate; Z_1 = assay of zinc in zinc concentrate;
L_2 = assay of lead in zinc concentrate; Z_2 = assay of zinc in lead concentrate;
L_3 = assay of lead in tailing; Z_3 = assay of zinc in tailing;
Y = tons feed;
Y_1 = tons lead concentrate;
Y_2 = tons zinc concentrate;
Y_3 = tons tailing.

$$\text{Lead extraction} = \frac{L_1}{L} \times \frac{Y_1}{Y} \times 100$$

$$= \frac{L_1}{L} \times \frac{(L-L_3)\ (Z_1-Z_3) - (Z-Z_3)\ (L_1-L_3)}{(L_1-L_3)\ (Z_1-Z_3) - (Z_1-Z_3)\ (L_1-L_3)} \times 100$$

$$\text{Zinc extraction} = \frac{Z_1}{Z} \times \frac{(Z-Z_3)\ (L_1-L_3) - (L-L_3)\ (Z_1-Z_3)}{(Z_1-Z_3)\ (L_1-L_3) - (Z_2-Z_3)\ (L_1-L_3)} \times 100$$

Ratio of concentration

$$\text{Lead} = \frac{L_1 \times 100}{L \times \%\ \text{extraction}}$$

$$\text{Zinc} = \frac{Z_1 \times 100}{Z \times \%\ \text{extraction}}$$

The Native Ores of Quicksilver

"What ores of quicksilver are found in the United States?"

The commercially important quicksilver minerals are cinnabar and native quicksilver, according to Bulletin 222 of the U. S. Bureau of Mines. Pyrite and marcasite often are associated with the cinnabar, as are small quantities of other sulphides, including those of arsenic and antimony. Native sulphur and bituminous matter also occur in some ores. Quicksilver ore is found in rocks of all geologic ages and all classes; hence the gangue material of the ore differs in different mines and often in the same mine. Common gangue rocks are limestone, calcareous shales, sandstone, serpentine, chert, andesite, basalt, and rhyolite. The great variety of gangue minerals connotes a corresponding variation in the physical characteristics of the ore. Two general types of cinnabar ore can be distinguished, namely: Disseminated ore, in which the cinnabar has impregnated a more or less fine-grained or highly brecciated gangue; and ores deposited in fissures and cracks of the country rocks. In at least one body of disseminated ore the cinnabar was precipitated simultaneously with the amorphous silica cementing a brecciated rock. The second type of ore merges into the first as the fissures and cracks become very minute; at its other extreme are large veins and bodies of almost pure cinnabar, sharply separated from the inclosing gangue.

Both types of ore may form high-grade or low-grade orebodies, may be hard or soft, may break into coarse or fine fragments, may show the red cinnabar plainly or may not, and may contain any of the associated minerals already mentioned. In general, quicksilver ores of the United States do not carry other metallic compounds, such as those of arsenic and antimony, in sufficient quantity to influence metallurgical treatment.

Removing Roll Shells

"I was much interested in the short article on 'Replacing Roll Shells' in your issue of Oct. 31. The article states that the old shells are removed by cutting with an oxy-acetylene torch. I should like to know how far, if at all, this causes damage to the cone faces of the roll centers. Such damage would be negligible except as regards having a clean cone surface to fit to the new shell. It would be of interest and of value to me to know how this difficulty, potential or actual, is overcome at the Miami Copper Co.'s crushing plant."

H. D. Hunt, metallurgist for the Miami Copper Company, has kindly supplemented the information given in the earlier article. He says that the roll shells are made of high-carbon forged steel and the method of burning the old shells is designed to cause breakage of the shells rather than the actual burning of the old shell from the roll centers. The practice is as follows: Keeping the flame of the oxy-acetylene torch parallel to the face of the shell, a single narrow groove about ½ in. deep is burned clear across the face of the shell. This groove is deepened by subsequent burnings, but particular care is taken not to burn completely through the thickness of the shell. When the shell is sufficiently weakened it will break from the stresses set up. Breaking of the shell can be assisted by striking the shell near the weakened point with a sledge or by sudden cooling with water of the heated portion of the shell. Following this procedure, it is seldom necessary to burn completely through the shell, and if the burning is carefully done the roll centers are untouched. However, should the roll centers be slightly burned, dressing off the burned spots with a rough file will repair the damage.

After the initial break in the shell has been made, it is usual to wedge the shell from the roll centers and cut the shell into three pieces, which may later be straightened and used for chute liners.

This method of replacing roll shells has been used on two sets of 75- x 24-in. rolls for four and one-half years without any serious effect upon the roll centers.

News of the Week

The Mining News of ENGINEERING AND MINING JOURNAL-PRESS is obtained exclusively from its own staff and correspondents, both in the United States and in foreign fields. If, under exceptional conditions, material emanating from other sources is published, due acknowledgment and credit will be accorded.

Summary

REDUCTION of freight rates on explosives saves Canadian mines $125,000 per year.—Lead carbonate reported in Northern Ontario.—Mattawin iron range, Western Ontario, to be developed.

New mining camp in Death Valley, Calif.—Kennedy mine, at Jackson, improves.—Calaveras Copper Co. to increase plant 50 per cent.

Government-owned copper mine in Norway not operating; property now undergoing thorough examination to determine best plans for working.

Arkansas manganese production now under direction of a new company.

Alaska petroleum reserves to be mapped.—Palladium reported on Prince of Wales Island.

Belmont Copper Co. reported as having discovered high-grade silver-lead-zinc ore; San Pedro Leasing Co. names officers.—Southwest Metals Co. to resume smelting.

Record month markets 83,842 tons of zinc concentrate in Joplin-Miami district.—Eagle-Picher purchases additional ore lands.

Consolidated Goldfield (Nev.) considers reworking tailing dump.—Comstock Merger mills 38,000 tons per month.—Mining Exchange formed at Reno.

Outlook for lead and tin in London encouraging, as demand increases and new deposits not forthcoming.

Utah-Delaware acquires five-year lease on Utah Metal & Tunnel Co. property at Bingham, Utah.

No Surplus of Refined Copper at Michigan Mines

Calumet & Hecla Produces 9,000,000 Lb. per Month—Trimountain Again on Shippers' List

Metal business continues good at all smelters in the Michigan copper district. There is no refined surplus, and orders on the books will take care of February production. Calumet & Hecla, Copper Range, Mohawk, and Quincy are shipping copper to Detroit, Chicago, Philadelphia, and New England, with the Middle West taking the bulk of the shipments. Some metal is going to France, but export business still is negligible. Owing to the increase in demand, Calumet & Hecla reduced its stated surplus of metal by 5,508,555 lb. during the last quarter of 1925, leaving a surplus on Dec. 31 of 33,296,064 lb., compared with 38,804,619 on Sept. 30. This surplus is in mineral and mass copper rather than refined. Calumet & Hecla's refined production per month, including Isle Royale, a subsidiary, now exceeds 9,000,000 lb. Improvement work still is under way at the smelter. With the completion of this program several months hence the company will have three large units for melting and refining, capable of turning out about 12,000,000 lb. of copper per month, and casting machinery for any shape desired by the trade. The plant will be modern in every detail and permit the abandonment of all the smaller units; a further economy will be effected through the use of pulverized fuel.

In No. 4 shaft, Calumet branch of Calumet & Hecla Consolidated, gas is still in evidence as a result of the fire which broke out on the 57th level and damaged the shaft in the latter part of 1924. The shaft, however, has been repaired down to the 39th level. No. 2 shaft is now producing.

Seneca, the newest producer, is now shipping around 1,000 tons daily, and two stamps are dropping constantly. The management is well satisfied with the yield of refined copper per ton of rock.

Trimountain is again figuring in production at Copper Range, producing at about the rate of 175,000 lb. of copper per month. In each of the years 1924 and 1923 Trimountain produced less than 300,000 lb., and development work continued throughout the greater part of 1925 on account of the low price of copper. The mine is extensively opened and all drifts are in good ground. While the excess flow of water in Champion still affects costs, the volume has abated considerably. The decrease is encouraging in that it shows the source is not unlimited and disproves the theory that the water was seeping through from Lake Superior.

Reorganization of the Copper Export Association

PRELIMINARY conferences in which most of the copper producers interested in foreign markets have participated have resulted in the drafting of a plan for the formation of an export association under the provision of the Webb-Pomerene law. The drafts have been submitted to counsel of the respective companies for study.

Noranda Mines Financed by Hollinger Gold Mines

First-Mortgage Bonds Issued for $3,000,000—Much Activity in Rouyn District

Arrangements have been completed for the financing of the Noranda Mines. This will be accomplished by an issue of $3,000,000 7 per cent first-mortgage bonds, which are being taken up by the Hollinger Gold Mines. A further $1,000,000 will be raised by an issue of treasury shares, on the basis of fifteen shares for each share now issued. This money will permit the Noranda to proceed with the plans for the complete equipment of the Horne mine.

A great deal of freight is being hauled into the property over the winter roads and the construction of foundations for the 500-ton smelter unit will start as soon as the weather permits. When the railway is completed, which will be some time during the present year, complete installation will be put in and production started as soon as possible.

Conditions at the property itself are satisfactory. New orebodies have been discovered and known orebodies have been proved at greater depth, and it is believed that the gross value of the ore indicated above the 300 level amounts to about $40,000,000. The method of financing, though different from what was expected, will permit the Noranda to retain intact in its treasury the 90 per cent interest in the Horne mine. The customs smelting branch of the business should be a profitable one, because the Waite-Montgomery property appears to be exceedingly important and it is hardly to be

expected that two smelters will be constructed in the district.

There is a great deal of activity and interest in the Rouyn district as a whole, and important developments are expected during the present year. In the western section, high-grade copper-gold ore has been found on the Alderson-McKay property, in two veins, one about 6 ft. wide and the other 35 ft. wide. The Laval-Quebec properties in the same neighborhood have been financed. A plant has been purchased and the contract for work has been let. In Cadillac, the O'Brien gold property is developing satisfactorily and other properties in the vicinity are very interesting. Chief interest, of course, will be in the central section, where the Horne, Waite-Montgomery, and Amulet are located. The Horne is bringing in very large quantities of supplies over the winter roads; exploration of the Waite-Montgomery, where excellent results have been obtained, is being pushed, and new mining plants are being installed on the Amulet.

Premier-Paymaster Mill Ready for Operation

The starting of the 150-ton mill of the Premier-Paymaster, of the Porcupine area of northern Ontario, which is expected to be ready for operation about March 1, is looked forward to with considerable interest. As the property lies some distance south of the hitherto productive part of the Porcupine district, there has been some conflict of opinion as to the probable outcome of the enterprise, and the result is likely to have an important bearing on the future of the Porcupine field.

French Exchange Professorships

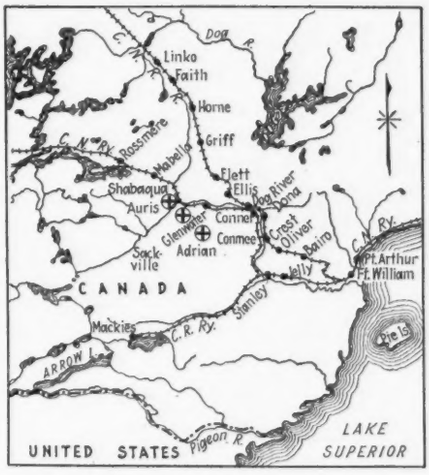
For a number of years seven American universities—Columbia, Cornell, Harvard, Johns Hopkins, Massachusetts Institute of Technology, University of Pennsylvania, and Yale—have been exchanging professors with the universities of France. Eminent men have come to this country from France, and some intellectual leaders of the United States have visited France.

This exchange has proved of great value in that forthstanding men of America spend some months among foreign universities, while men of like ability come from Europe to visit our schools, lecturing and meeting students and faculty face to face. This makes it possible for thousands of students to come into personal contact with men of conspicuous ability from other lands, and in some measure to become acquainted with their points of view and methods of thought. An important consideration is that the student shall know a leading thinker of another nation and gain some comprehension of how and what he thinks.

A number of scholarships under which students may study in foreign lands have already been established. Rhodes scholars from America study in England. Chinese and European students come to the United States under various auspices. All this is splendid for the fortunate students, and, through them, for their native countries.

Mattawin Iron Range, Ontario, to Be Developed

A syndicate of Minneapolis and Duluth financiers has been formed to consider the development of a new iron range in the Lake Superior district known as the Mattawin range of Ontario. The property embraces 10,000 acres and is about four miles from the Canadian National Railroad and forty miles from Fort William, Ont. The ore is low-grade magnetite, requiring crushing, grinding and sintering to make it fit for furnace consumption. Owing to the fact that the Province of Ontario must import annually more than a million tons of ore from the United States, and also that the province grants a bounty of one-half cent per unit on iron ore produced within its boundaries, the syndicate believes that with the low estimated cost for mining



Mattawin range district

and milling the property can be made to pay, and it is expected that $3,000,000 will be spent in opening and developing the ore beds.

The men interested in this project are John R. Mitchell, president of the Federal Reserve bank of Minneapolis; Charles H. Hood and William T. Fraser, also of Minneapolis, and Howard T. Abbott, E. P. Fulton, and Frank Hutchinson, of Duluth. Dwight E. Woodbridge, of Duluth, held the options that were turned over to the syndicate.

Mine Owners' Association Elects Officers

The Cripple Creek Mine Owners' Association at its recent annual meeting re-elected Judge E. A. Colburn, of Denver, president; J. W. Ady, of Colorado Springs, vice-president, and W. A. Wanamaker, of Cripple Creek, secretary.

Acacia Gold Mining Co. has elected Kenneth MacKenzie president and manager, and George Zoller, of Rochester, N. Y., secretary-treasurer. The directorate elected consists of the officers named and G. B. Gould, of Colorado Springs, and M. H. Etzler and Adam Freidrich, of Rochester. The Free Coinage Co., which is controlled by the Acacia company, elected Leo F. Lebrun, president, and Kenneth MacKenzie secretary-treasurer. The Acacia will raise $25,000 for leasing purposes.

Mines Tax Not Contested by Montana Operators

Montana's metal-mines license tax has gone uncontested in its first year of operation, and as a consequence the state general fund was enriched by approximately $200,000. The tax law enacted by referendum at the November election in 1924 yielded last year about $400,000, most of which was paid under protest. The right of the mining companies to contest the law by suing the state for the return of these protested taxes expired on Jan. 29, according to James Rogers, Deputy State Treasurer.

Verde Central to Sell 400,000 Shares Treasury Stock at $2

Verde Central, control of which is owned by Calumet & Arizona, will offer stockholders 400,000 shares of treasury stock at $2 per share to finance further development and operation of the property. The stock will be issued on the basis of one share for every four shares of stock of record at the close of business Feb. 13.

New Mining Camp in Death Valley Region

Leadfield is a new lead-ore mining camp in the Death Valley region of California. It is in the Grapevine Mountains about 18 miles from Beatty, Nev., to which it is being connected by road. Original locations are said to have been made by Ben Chambers and Frank J. Metts in March, 1925. In July, 1925, the Western Lead Mines Co. was organized by John Salsberry, Jacob Berger, and W. E. Staunton. Production was made from promising lead-ore prospects. Many additional locations have since been made.

Calaveras Copper to Increase Plant

Calaveras Copper Co. of Copperopolis, Calif., will enlarge its present plant, which consists of a flotation mill and smelter, to provide for an increased production of 50 per cent over its present output. Plans are under consideration for the construction of a wire-drawing plant at Stockton, Calif. As the ore handled by the company contains practically no gold or silver, the copper produced can be refined at once and is then ready to be sold.

Kennedy Mine in Improved Position

Kennedy mine, near Jackson, Calif., is now operating 60 stamps and treating 8,200 tons per month. A short time ago 80 stamps were operated, but under the new conditions and 60 stamps operating, increased labor efficiency and decreased labor turnover have resulted in lower operating costs.

Stoping is now under way on the 4,350 level and plans are in preparation for sinking an additional 150 ft. to the 4,500 level. Estimates are being made for the electrification of the present steam hoist. New hoisting arrangements provide for a hoisting depth of 5,000 ft.

News From Washington

By PAUL WOOTON
Special Correspondent

Government Investigates Varied Mining Activities

Bureau of Mines to Prepare Bulletin on Transportation in Outlying Mining Districts—Electric Ore-Finding Devices Under Consideration

ALL available information with regard to transportation in outlying mining regions is to be assembled by the U. S. Bureau of Mines. Were data of this character assembled in a bulletin it is believed many operators in remote regions, particularly, would be saved large sums frequently spent because they are unfamiliar with the experience of others. In compiling this information the co-operation of the Canadian Government will be sought. It is believed that the Alaska Road Commission will be able to contribute an interesting chapter to this bulletin, as that agency has been active in studying transportation problems under difficult conditions. Tests of snow motors have been under way this winter. Col. J. G. Steese has just returned from a trip to the Sahara desert, where he made a study of the progress being made there in motor transport. He now is making arrangements to try out Renault six-wheel, double-tire cars on the Alaska tundra. Cars of that type are being used with great success in the Sahara. The proposed bulletin will contain tables showing the average requirements of food per man and of the equipment necessary at operations at points distant from a railroad.

The study will cover the use of airplanes, motor trucks (with and without caterpillar tread), tractors, snow motors, and other vehicles. Comparisons will be made with the cost of animal transport. So far as is known this will be the first attempt to compile under one cover the available data on this important phase of mine transportation service.

Director Turner of the Bureau of Mines is considering the initiation of studies of the fundamental principles involved in electric ore-finding devices. There are many of these devices, but the effort to perfect each type of device is going forward without complete knowledge of the principles involved. Practically all of the large metal-mining companies now are trying out devices of this character. It long has been recognized, Mr. Turner points out, that continental United States has been so thoroughly prospected that practically all metalliferous outcroppings of promise are known. Undoubtedly other mineralized areas exist where there are no outcrops. Sufficient success has been attained in detecting such deposits that Mr. Turner believes research by the government is justified.

The Metric System

Voluminous testimony has been taken by the Coinage, Weights and Measures Committee of the House of Representatives in support of Representative Britten's bill, providing for the compulsory use of the metric system for certain purposes on and after January 1, 1935. Numerous witnesses were introduced, including Dr. Harvey W. Wiley, former chief of the Bureau of Chemistry; Dr. Charles L. Parsons, secretary of the American Chemical Society; Representative Britten, author of the bill, and Frederick L. Roberts, treasurer of the Metric Association.

Representatives of those opposed to the legislation made brief statements intended to demonstrate to the committee that the opposition to the legislation is general in many lines of industry and trade. As they had only two days' notice of the hearing, an adjournment was asked so as to give them an opportunity to arrange for the appearance of outstanding men in industry. To this Chairman Perkins agreed. The date of the further hearings is to be fixed later.

Alaska Petroleum Reserve to Be Mapped

A new search for oil in the Navy's petroleum reserve in Arctic Alaska with explorations of the adjacent country has been announced by the Interior Department. Gerald Fitzgerald, topographic engineer, and W. R. Smith, geologist, of the U. S. Geological Survey, will make the survey and will leave Washington soon. Both are familiar with the northern Alaska Peninsula, having made several trips there to make topographic surveys and examinations for oil.

The region in which the Naval reserve is situated is so remote and inaccessible that only by traveling during the winter is it possible to take advantage of the brief open season when the Arctic Circle country is free from snow and rocks are exposed. The summer season is only about two months, in which work can be done. During this period there are twenty-four hours of daylight, making it possible to do much work in a limited time.

It is believed that, as a result of this survey, an area of 7,000 to 10,000 square miles of hitherto unsurveyed country, a tract about as large as Massachusetts, will be mapped with the degree of accuracy required by reconnoissance standards, and that the major geologic features will be determined as well as the principal kinds of mineral that are likely to be found in the region. The new surveys should be of value not only in furnishing information about an almost unknown tract of country but in assisting in interpreting and supplementing the data that have been gathered in the explorations during the last three years in northern Alaska, primarily at the request of the Department of the Navy and at its expense.

Fluorspar Freight Rates

The freight rate on fluorspar from seaports to Pittsburgh, Pa., as shown by the Tariff Commission quoted in the *Mining Journal-Press*, Jan. 30, 1926, as $5 per ton, is subject to a slight correction. The freight rate per gross ton from Philadelphia to Pittsburgh is $4.10, and from Baltimore to Pittsburgh $3.90. The rate from the Illinois and Kentucky mines to Pittsburgh is $5.25 per short ton; from Mobile, Ala., to Birmingham, the freight rate is 14½c. per 100 lb., as compared with 19c. from Rosiclare, Ill., and 17c. from Marion, Ky., all of which is to the disadvantage of the domestic product.

Potash Discovered in New Mexico While Drilling for Oil

Promising sources of potash in the salt beds of western Texas and southeastern New Mexico have been discovered that may check the domination of the potash market in the United States by foreign producers, according to a U. S. Geological Survey report. The report indicates that these beds are likely to be thick and extensive, suggesting large potash salt deposits, and though the discovery was made through the drilling for oil the cuttings have revealed potash salts such as are found in Germany and France.

In August, 1924, the producers in Germany and France signed an agreement concerning sales of their potash in the United States and now supply directly or indirectly 90 per cent or more of the potash sold here.

Petroleum Engineering Popular at Golden

The petroleum engineering course as taught at the Colorado School of Mines at Golden, Colo., shows an increased enrollment each year. Treatment of oil shale is one of the main features covered. Though on a small scale, the machinery used at the school is complete in every detail. The oil is refined in its entirety. This year the course is being taken by engineers who were graduated years ago in other branches.

New Smelting Company in Montana

With a capital stock of $5,000,000, the Montana Smelting & Refining Co. has been organized by Arthur Tuttle, a banker of Boulder, Mont.; Gus Wallin, a merchant of the same city, and John F. Wallin, also a merchant, of Basin, Mont. The charter has a life of forty years and principal place of business is designated as Basin. M. A. Hauser, mining operator, backed by New York capital, will sponsor the enterprise.

Bluebell Increases Its Force

The Bluebell mine, in the Mayer district, in Arizona, has put on an additional force of twenty-five men, the addition being due, so it is reported, to a resumption of work by the Southwest Metals company's smelter at Humboldt.

Mineral County, Nev., Has Two New Mills

Two new modern mills for the reduction of silver and silver-lead ores have been completed and will start operation soon. Hawthorne Mines, Inc., has built a 200-ton flotation mill at the Lucky Boy mine, five miles west of Hawthorne, and the Mono Mining Co., of Nevada, has finished a 100-ton cyanide mill near Sweetwater, Mineral County, to mill ore from its Silverado and Kentuck mines, which are just over the line in California.

The flotation mill of the Hawthorne Mines, Inc., is operated by electric power, purchased from Mineral County, which owns a system for the distribution of power. The company owns a number of mining properties extending for two miles along a limestone uplift, of which the most highly developed is the Lucky Boy mine.

The Goldfield Consolidated made an attempt to re-treat these tailings after its mines were pretty well worked out, but the plan did not operate successfully and resulted in a large loss. The gold is known to be there, and many plans have been considered and rejected. It is simply a case of cost and recovery.

Utah-Delaware Leases Utah Metal & Tunnel Property

Utah-Delaware Mining Co., a subsidiary of the International Smelting Co., owned by the Anaconda Copper Mining Co., has taken a five-year lease on territory of the Utah Metal & Tunnel Co. at Bingham, Utah, lying west of the Occidental fault. The territory involved in the deal just closed is that to which the mineral rights were relinquished in 1918 by the Utah Consolidated, taken over by the Utah-Delaware last year for indebtedness to the International Smelting Co.

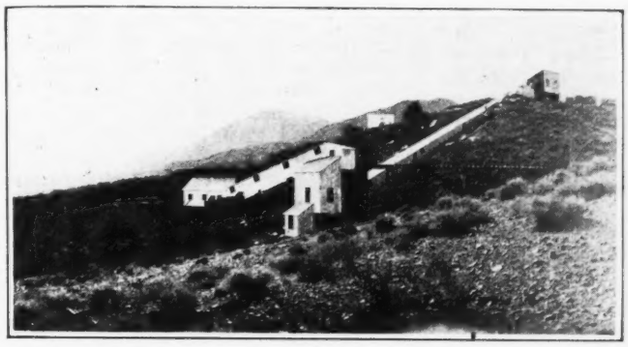
During last year, a crosscut driven from the 1,800 level of the Utah-Delaware toward the boundary line agreed upon between Consolidated and Utah Metal in the settlement of 1918 opened up a promising ore deposit in a heavy limestone bed. Under the new lease the Utah-Delaware will develop through its shaft, thus saving the Utah Metal & Tunnel the expenditure of considerable time and money. The Utah Metal & Tunnel will further explore and develop the region west of the Occidental fault where operations during the last two years have shown encouraging results.

For the work here and at other points in Utah Metal ground, Utah-Delaware has agreed to furnish the necessary funds, having the privilege of reimbursing itself by taking over from Utah Metal 250,000 shares of the latter company's stock at par, $1 per share. To provide for carrying out the terms of this agreement, the capital stock of the Utah Metal & Tunnel Co. will in due course be increased to 1,250,000 shares.

San Pedro Leasing Co. Appoints Officers

The San Pedro Leasing Co. recently organized to operate in the Bisbee district, Ariz., has appointed George Jay, president of the Bisbee Chamber of Commerce, and purchasing agent for the Calumet & Arizona Mining Co., as president of the leasing company. J. J. Murphy was chosen vice-president, and C. C. Wolfe, assistant purchasing agent for the Calumet & Arizona, secretary and treasurer.

The San Pedro Leasing Co. was organized under the laws of Arizona on Aug. 3, 1925, to do a general leasing and mining business in the state. Several claims are owned by the company, the work at present being confined to the Portland claim in the Tombstone district, where recent development work reveals ore of unusual promise.



Plant of Hawthorne Mines Co., near Hawthorne, Nev.

Flotation mill, Hawthorne Mines Co.

Comstock Merger Mills 38,300 Tons per Month

The Comstock Merger Mine, operating in the Tonopah (Nev.) district, milled 38,300 tons of ore during December, 1925, which averaged $4.80 per ton. Bullion shipped was valued at $171,000. Development for the month totaled 2,100 ft.

At the Overman shaft, work was concentrated on widening the proposed tramming drift from the Overman shaft to the Crown Point-Belcher. As soon as this work is completed the old stopes to the north will be prospected and development carried to new territory north of these filled stopes. Work has also been started from the 200 level of the Yellow Jacket, driving northerly toward the Imperial.

Consolidated Goldfield Tailings May Be Reworked

Mark Bradshaw, of Tonopah, Nev., has devised a method for the re-treatment of the Goldfield Consolidated tailings, at Goldfield, which he regards as feasible. It is estimated that this pond contains around 2,000,000 tons of tailings which will average $1.62 per ton.

The plan is to sluice the tailings into a storage tank, pump them up to another storage tank at the old mill site, and then cyanide them in the regular way without further grinding. It is thought that twelve hours in solution will give a 65 per cent extraction and a profit of 45c. per ton.

Makes Good Gold Strike In Boulder Canyon

Reg Signe mine, in the Boulder Canyon of Colorado, operated by J. F. Barnhill, of Denver, struck gold on Jan. 17, and assayers say that it will run $2,000 to the ton. The find has created renewed interest in that old mining section.

Operations at Old Congress Mine May Be Resumed

The Congress mine, the deepest in Arizona, and at one time its largest gold producer, may resume operations, if a recent agreement is carried out by California capitalists. The Carson-Wyman Syndicate has obtained a ninety-day option on the property for the purpose of sampling and testing, and four representatives of the company are now said to be at Congress, preparing for the work. The mine is situated at Congress Junction, on the line of the Phoenix, Prescott & Santa Fé Railroad.

New metallurgical processes give rise to the belief that considerable gold may be obtained from the dumps of the mine. The tailings dump is estimated to contain between 600,000 and 1,000,000 tons of workable ore, and the mine dump is still larger.

Logan Mine Under New Management

The Logan mine, three miles southeast of Cherry, Ariz., has been taken over by a group of New England capitalists and a campaign of development has been started. The property is equipped with a 10-stamp mill, but it is expected that additional milling machinery will be installed soon. The new company has no stock for sale. A new dormitory, kitchen, and dining room, and an office and assay plant have been built and a new electric lighting plant has been installed. James Hines is superintendent.

Manganese Mining in Arkansas

Arkala Company Acquires Roach Hill and Eureka Mines

By Tom Shiras
Mountain Home, Ark.

The Arkala Manganese Ore Co., which recently purchased 608 acres of manganese ore land, including the Roach Hill and Eureka mines, in the Batesville-Cushman (Ark.) manganese field, has started work on a narrow-gage industrial railroad from Cushman to its properties, a distance of six and one-quarter miles. The road will connect at Cushman with the Missouri Pacific, over which the ore will be shipped to the furnaces. The transportation problem, especially in this section of the field, has been a serious one, and this short line should furnish shipping facilities for some tonnage that was formerly moved with teams and wagons.

The personnel of the Arkala company is made up of Birmingham (Ala.) men who have been interested in iron mining in Alabama for many years. They expect to equip their manganese properties with machinery that will give them a regular output of modest tonnage.

Investigation of the manganese ore deposits in the field was started by the Arkala company last fall, and negotiations for the properties acquired were completed late in December. The acreage purchased was formerly owned by Shell and Beatty, two local operators.

The Roach Hill mine is on Polk Bayou, which affords ample water supply for washing and concentrating purposes. As is characteristic of the field, the ore occurs in a manganese-ore-bearing clay, which is the residual clay from the St. Clair limestone. The ore varies from minute particles to chunks that weigh upward of one hundred pounds. Openings on the property made before the Arkala company acquired it consist of four large open cuts. Mining, during former operations, was done with picks and shovels, teams, and scrapers. The washing plant was crude, consisting of a small log washer, with a big loss in fine ore. A considerable expense was added to the overhead by hauling the ore from the mine, on the mountainside, to the washing plant, on the bank of the creek, a distance of a half a mile. The recovery at this property under former operations showed approximately 50 per cent, and the clean ore runs about 25 points manganese and 15 points iron.

The Eureka mine, a short distance from Roach Hill, was opened up by W. H. Beatty and associates in 1917, and has been operated off and on since. The property is equipped with a washing plant, which, when built, was the largest and most modern in the field. Since operations started on this property it has been a factor in the production of the field. Most of the mining here has been carried on with picks and shovels and teams and scrapers. A steam shovel was used at times.

The orebody at the Eureka occurs much the same as it does at the Roach Hill. A considerable tonnage of ore is in sight, and prospect shafts on other parts of the property, away from the point of operation, have disclosed other orebodies. The washing plant consists of two 30-ft. log washers, sizing screens, jigs, belt conveyor, and other equipment of minor importance. The concentrate averages higher than at the Roach Hill mine, showing from 35 to 42 points manganese. Former operations at this property have been hampered by bad roads leading to shipping point. Construction of the narrow-gage railroad however will overcome this difficulty.

During the last ten years' operation in the field there has been an enormous loss in fine values. It would be conservative to say that 25 per cent of the ore mined during that period is still in the old dumps, or where washing plants were operated. Few of the washing plants are equipped with jigs, the crude ore being merely passed through the log washers. The Arkala company will endeavor to recover all values in the deposits and produce a good grade of ore. The concern maintains its main office in Batesville, Ark.

Operations in the field in 1925 were about normal, no new developments of any consequence being made. Production was if anything a little less than in 1924. That of low grade amounted to 4,950 tons and of high grade to 3,488. Most of it went to the Birmingham furnaces.

Record Month for Zinc Sales Joplin-Miami

ALL records for purchases of zinc ore in the Joplin-Miami field were broken in January, 1926. The total for the five weeks was 83,842, divided as follows: Week of Jan. 2, 7,590 tons; Jan. 9, 16,423; Jan. 16, 23,188; Jan. 23, 18,370; Jan. 30, 18,271.

Though there were five Saturdays in January, the purchase record is greater than for any other five weeks in the district's history, so far as can be learned. Not all the ore bought was shipped, shipments totaling only 76,579 tons.

Annapolis Lead to Reorganize and Resume Operations

The Annapolis Lead Co., which suffered heavy damages to its property when the tornado of March 18, 1925, struck the town of Annapolis, Mo., since which time it has been idle, will be reorganized and will begin operations within two or three weeks, according to an announcement of M. C. Rhodes, president of the company. A foreclosure suit against the company, which is capitalized for $2,500,000, will be dismissed by the bondholders who instituted it, Mr. Rhodes said.

Oil Exchange Moves

The Colorado Oil Exchange has moved from 628 Seventeenth Street, Denver, to the ground floor of the Denham Building, Eighteenth and California Streets, same city.

Dillon, Read & Co. Allow Options to Expire

Apparently Dillon, Read & Co., prominent in financial circles in New York, have decided not to enter the Joplin-Miami district for the present. Options which they were said to hold on mining lands and mills in that field have been allowed to expire recently. At one time it was unofficially reported that the New Chicago mine had been optioned for $1,250,000; the Velie-Lion for $640,000; the Rialto for $600,000; the Coyne for $550,000; and the R. A. S. P. for $200,000. The owner of the Rialto now denies that an option was ever granted on his property, but it is believed options did exist for the others. It was supposed the properties mentioned were all to be placed under one management.

Galena in Bucks County, Pa.

Reports are to the effect that a promising deposit of galena has been found near Doylestown, Pa. The ore occurs in a fissure vein in a country rock of slate and schist. A shaft has been sunk about 70 ft. on the vein, which is said to be only a few inches thick at the surface and about two feet thick at the bottom of the shaft. Some sphalerite occurs with the galena. It is claimed that this deposit was worked about 1860. Old open pits, now filled with water and wash material from the banks, bear testimony as to mining or prospecting in earlier days.

Fire Damages Goldsmith Mine in Walkerville District, Mont.

Fire caused by clothing hung too near a stove in the mine office nearly destroyed the surface plant at the Goldsmith mine of the Crystal Copper Co., in the Walkerville district, north of Butte, Mont. At the time of the fire only two men were underground, P. C. McGuigan, pumpman, and Daniel Sullivan, shift boss. McGuigan had come up on the cage before he knew there was a fire, and soon after he reached the collar the cage dropped. McGuigan and Charles Hall descended the ladders to the 800 level, where they found Sullivan, who was in the drift away from the shaft, as he realized there was a fire on top. The trio climbed to the surface through the dripping water and smoke.

The water in the mine will be raised by means of pumps supplied with air from the Moulton mine (W. A. Clark interests), about one-half mile distant. The mine employs sixty men.

Nevada Mine Operators Form Exchange at Reno

The Nevada Mining Exchange has been formed by Nevada mine operators and brokers to deal in Nevada mining stocks. It will have headquarters in Reno and is designed to provide a market for companies unable to list their stocks on the San Francisco Stock Exchange. Permanent officers will be selected at an early meeting. At the preliminary gathering fourteen charter members registered and pledged listing of companies.

Toronto Letter

By Our Special Correspondent for Northern Ontario

Reduced Freight on Explosives Saves Mines $125,000 per Year

At a recent sitting of the Board of Railway Commissioners in Ottawa, the application of the railways for a rehearing of the case involving a reduction in the freight rates on high explosives was dismissed. As a result the new reduced rates became effective Feb. 4, and effect a decrease of approximately 15 per cent on freight rates in Eastern Canada. The new rates on the C. P. R. and C. N. R. make possible a saving throughout Canada of approximately $125,000 a year, most of which goes to the mining industry. In northern Ontario alone the new rates represent a saving of about $38,000 a year, under present conditions. This will be increased by the action of the T. & N. O. Railway in voluntarily reducing its rates on car lots. This reduction will bring about an additional saving to the mines north of North Bay, which will include the new Quebec fields, of from 7c. to 21½c. per 100 lb. The T. & N. O. Railway, being an Ontario Government owned railway, is not subject to the rulings of the Board of Railway Commissioners, but the company decided to make a voluntary reduction.

During January, shipments from the Teck-Hughes Gold Mines, of Kirkland Lake, amounted to $180,000, which is the largest in the history of the company. Mill heads are running high, the increase being due to the rich ore encountered in developing of the three lower levels.

At the Canadian Lorrain property, in South Lorrain, the raise on No. 17 vein is now up 100 ft. and will be connected to the workings on the 250 level. The raise was in high-grade ore practically all the way, and the company has recently shipped a carload of ore, which is said to be the richest car ever shipped from South Lorrain. A number of other veins are known which carry payable ore, and these are to be aggressively developed.

Lead Carbonate in Northern Ontario

Carbonate of lead has been found in a 2-ft. vein on a claim on Gillies Limit, in the Cobalt area of northern Ontario. Specimens received by the Ontario Department of Mines have been found to be of sufficient interest to induce A. G. Burrows, chief of the geological staff, to arrange for an early inspection of the discovery. This is the first discovery of the kind reported for this part of northern Ontario.

Hunton Kirkland Gold Mines Reorganizes

At a meeting of the shareholders of the Hunton Kirkland gold mines of Kinkland Lake, northern Ontario, on Jan. 26 the reorganization of the company was authorized. The assets are to be sold to a new company to be named Kirkland-Hunton Mines, Ltd., to have the same capital as the old company, 4,000,000 shares of the par value of $1, the shareholders to receive one share of the new stock for each two shares now held. The completion of the sale will leave the company with half its capital unissued. The company has more than $30,000 cash in the treasury, and it was stated that the reorganization would finance operations for the next two years.

Lorrain-Trout Lake Progress

The progress report on the Lorrain-Trout Lake for the last quarter of 1925 shows a total production of 89,900 oz. of silver. Milling ore had an average assay of 21 oz. a ton. On the 250 level a 75-ft. stope of mill ore has been opened. The new No. 2 shaft 1,600 ft. southwest from the No. 1 has been completed to 365 ft. and a total of 1,027 ft. of drifting and crosscutting has been accomplished. Several shoots of ore have been encountered, and this is considered particularly encouraging as the 365 level is 300 ft. above the diabase contact, in the vicinity of which the best results are to be expected.

At the Castle property, in Gowganda, a new discovery is reported on the 525 level, where high-grade ore has been found. Production is at the rate of 8,000 oz. a month.

Belmont Copper Co., at Superior, Uncovers Large Orebody

Belmont Copper Co., Superior, Ariz., is reported to have drifted 6 ft. into a vein showing values that, according to Albert J. Smith, mining engineer, and Chester Hoatson, superintendent, will probably run $50 a ton. The new strike is conceded to be one of the most important made in the Superior district in recent years. Ore was struck on the 1,150 level, under strong surface outcroppings, and the values are in silver, lead, and zinc. Plans are being made for ore shipments on a large scale at an early date.

Nascut Mine Reported to Have High-Grade Ore

High-grade ore is said to have been found in the Nascut Mine, about seven miles from Vail, in Pima County, Ariz., and owned by Bisbee men. The mine is at the foot of the Santa Rita Mountains on the northwestern side of a well-defined mineral region. The main shaft is 42 ft. deep and has encountered ore at the bottom of the shaft from where a drift is being run. Excellent equipment with the necessary machinery, hoist, and compressor, has been installed and is operating smoothly.

Shipments to Trail Smelter Include Mill Ore

Following is a statement of ore received at the Trail Smelter of the Consolidated M. & S. Co. of Canada for the period Jan. 8 to 14, inclusive:

Name of Mine	Class	Locality	Tons	
Allenby Copper Co.	Copper	Allenby, B. C.	468	
Velvet	Copper	Rossland	20	488
Bell	Lead	Beaverdell	32	
Duthie	Lead	Smithers	27	
Paradise	Lead	Lake Windermere	38	
Star	Lead	Windermere	3	
Silversmith	Lead	Sandon	75	175
Bluebell	Milling ore	Riondel	965	
Cork Province	Milling ore	Zwicky	45	
Imperial	Milling Ore	Rock Creek	47	
Lucky Jim	Milling ore	Zincton	441	
Ruth	Milling ore	Sandon	46	
Tariff	Milling ore	Ainsworth	39	1,583
McAllister	Dry	Three Forks	66	
Yankee Girl	Dry	Grand Forks	11	77
Silversmith	Zinc	Sandon	90	90
Company mines				5,632
Total tons				8,045

Eagle-Picher Purchases Near Waco, Mo.

Eagle-Picher Lead Co. has purchased an operating option on the mill and 473 acres of leases in the Waco, Mo., section of the Joplin-Miami district, owned by Frank Childress and Bai Lihme, who took over the properties more than a year ago from Franks and Danglade, of Joplin. At that time there were two small mills on the leases, the Pyramid and Allegheny-Western. The latter was torn down, and parts of it were used to enlarge the Pyramid, which has been turning out from 100 to 150 tons of concentrates a week since it has been in operation.

It is the intention of the Eagle-Picher Co. to drill the property, still further enlarge the mill, and increase production. With this addition to the company's mining acreage in this district it is thought it will have an ample supply for its Hillsboro, Ill., smelter.

Rosendena Mining Co. to Install Flotation Mill

Rosendena Mining Co. of Badirguato, Sinaloa, Mexico, is installing a modern milling plant. The mill will be equipped with Simpson pneumatic flotation cells to treat a mixed sulphide ore carrying values in lead, zinc, copper, antimony, gold, and silver. Only twenty tons a day will be milled, as it is necessary to carry machinery and concentrates 25 miles by muleback.

Governor Morley a Mine President

Clarence Morley, Governor of Colorado, has taken over the interests of N. S. Clarke, engineer of mines, and has succeeded Mr. Clarke as president of the Fall River Mining Co. Mr. Clarke remains as consulting engineer for the company, but his other interests necessitated relinquishing the presidency. Its properties are on Fall River.

London Letter

By W. A. Doman
Special Correspondent

Outlook for Lead and Tin Flattering—Copper Not So Good

London, Jan. 26—Messrs. Brandeis, Goldschmidt & Co. have issued their metal market report for the last year, and in it express views as to the current year. They say that though 1925 cannot be regarded as satisfactory for the commercial world, there are indications of an amelioration. Copper remains at a low price because into the category of low-cost producers now falls more than 50 per cent of the world's production, while there are great expectations from low-cost producers in South America and Central Africa, and this they say must tend to keep the price of copper down.

There is no safety margin in lead, and no fresh discovery of the metal that would add materially to the supply has been made. The Mount Isa field, in Queensland, is stated to hold great possibilities, and lead may be soon forthcoming from the Congo. The outlook for the metal is good.

Owing to the statistical position of lead, considerable interest is being taken in lead-mining companies, particularly the Burma Corporation and San Francisco Mines of Mexico. The annual report of the latter company will be out toward the end of this week and I understand will make a very satisfactory showing.

There are no stocks of zinc anywhere except in the United States, and a rise in price is expected. Prospects for tin are considered good, as there have been no new discoveries of any moment.

Merricks, Crane & Co. had recently undertaken a mission to the Aporoma Goldfields in Peru, but it is now announced by cable that gold production is not at present possible owing to the fact that the workings have caved in, and that the plan suggested for building a dam would not alone provide sufficient water. A report by Mr. Archbold is now on the way.

It is stated that the Soviet authorities are creating a Pan-Union State trust to exploit the gold fields discovered last year among the headwaters of the Aldan River, in the Yakutsk Republic, Eastern Siberia.

With regard to the Harriman manganese concession in Caucasia, it is learned that the Caucasian Mining Association, consisting of German mine owners, did not cede its rights for a participation in the Harriman group's profits. The compensation offered was 6 per cent of the total compensation fixed for the old owners, equal to 25 per cent of the Harriman group's profit arising from the concession. Harrimans, it is said, have now agreed to raise the percentage from 6 to 10. An impartial commission is to determine final details.

The Harriman group is also said to wish to undertake the exploitation of new iron and lead mines in western Galicia and other parts of Poland.

The directors of the Electrolytic Zinc Co. of Australia have inspected the company's mineral fields on the West Coast of Tasmania. They are reported to be a big asset, and the original estimates of ore reserves are likely to be exceeded. The principal difficulties in the treatment of complex ores have been surmounted. A company is to be floated in London in conjunction with British and possibly American financiers.

Government-Owned Copper Mines in Norway Not Producing

In 1918 the Norwegian Government, according to the U. S. Department of Commerce, authorized an expenditure of 10,593,000 crowns (approximately $2,966,040) for the purchase of the Grong mines, at Gjersvik and Joma. Purchase of the shares in this company was concluded in 1923, by which time the government owned the entire stock with the exception of 245 preferred shares.

Since the purchase of the mines by the government, funds have been set aside for investigation of the mines and for possible operation of them at a later date. In the 1927 budget an amount of 94,000 crowns was set aside to be added to the 110,000 crowns provided for the same purpose in the current year. These sums are characterized as a "loan to the Grong mines." The board of directors of the mines have now recommended that investigations be started to decide on the possibilities for a profitable operation.

Information on hand indicates that the Gjersvik field contains about 1,500,000 metric tons of copper ore, and the Joma field is estimated to contain about 17,000,000 tons of pyrite. The government is willing to approve the carrying on of these investigations, it being necessary to find out the exact status of the mines before it will be possible to get them started or before it can be determined whether they shall be operated by private interests or by the government itself.

Reorganization of Amber Industry

Unfavorable conditions of the "Preussag," the state concern which manages the Prussian Government's monopoly of the raw amber business, extends to the German private manufacturers of amber goods, according to the commerce department. A reorganization by which both the state and private concerns would be combined into one has consequently been proposed, and is encouraged by the fact that most of the private concerns are heavily indebted to the state, which could not subsist on the foreign demand only. A bill submitted to the Prussian Diet proposes an amalgamation by which the state concern, one factory in Koenigsberg, three plants in Danzig, and one property in Berlin would unite interests, and it is understood that the arrangement provides for possession of 56 per cent of the new stock by the Preussag. Introduction of modern business and production methods and the standardization of products and prices are included in the plans.

Johannesburg Letter

By John Watson
Special Correspondent

Results of Platinum Development Encouraging—Zaaiplaats Tin Mined at 2,000 Ft.

Johannesburg, Jan. 5—The Transvaal Estates & Development Co., Ltd., known on the local Stock Exchange as "Devels," issued a report on Dec. 28, giving prospecting results, up to date, on the company's platinum farms on the Oliphants River block. On Forest Hill, a section 3,000 ft. long has been developed by incline shafts, to depths varying from 157 to 310 ft. The consulting engineer, C. B. Kingston, reports that the ore thus partly exposed gives an average assay value of 3.65 dwt. per short ton. A small concentrating plant is being installed for testing purposes. A separate reef, known as the Chrome Lode, has been opened up 2,000 yd. east of the main formation. Twenty-four samples taken at nineteen points averaged 8.28 dwt. over 25.4 in. On resampling assays varied between 4 and 6.4 dwt. The total footage to date is: Shafts, 2,493 ft.; trenches, 1,611 ft.; drives, 214 ft., and adits 540 ft. Expenditure to date is approximately £20,000. The price of Transvaal Estates Development shares on Dec. 31, was 20s.

First Transvaal Mine to Be Reworked

The first gold mine to be worked in the Transvaal, about 1872, was the Eerstelling mine, near Pietersburg. A new company has recently been formed called the New Eerstelling G. M. Co. to develop and work this property. A new headframe has been erected over the main vertical shaft. The mine is now equipped with a five-stamp battery, driven by a suction gas plant. The company's mynpacht comprises 1,109 acres and the farm on which it has the mineral rights is 6,809 acres in area. It was reported from Salisbury that Sir Thomas Cullinan had abandoned his option on platinum claims situated near the Hunyani River. This he denies, as he is retaining his interests and continuing investigations.

A London critic, Cor Rissik, recently referred to lenticular bodies of tin at Zaaiplaats, which he said had petered out between 20 and 200 ft. The secretaries of the Zaaiplaats Tin Mining Co., Ltd., now wish, most emphatically, to contradict these statements, as the tin deposits there are now being worked profitably, at an incline depth of over 2,000 ft.; they have produced tin to the value of £1,500,000, and the company has paid 685 per cent in dividends during the past seventeen years.

The old Goldfields' Hotel (a one-story building), at the corner of Main and Loveday Sts., dating from "the early days," is now being cleared away to make room for a handsome new structure, Locarno Home, a six-story building. On the Johannesburg Stock Exchange, during the past week, gold shares have remained steady, diamond shares have been active, and T. C. Lands declined, during the week, from 71s. 3d. to 67s.

Situation at the Mines

By Albert H. Fay
Assistant Editor

FOR THE MAJOR METALS, especially iron, lead, zinc, and silver, as well as non-metallics used in the building industry, the new year started with fairly good prospects for a prosperous year. In many of the cities the building program continues, and in rural districts there is much road building, which augurs well for the mining industry. As for copper, unquestionably large amounts of the metal will be used, but the mine and smelter capacities are such that an excess can and may be produced easily unless there is a voluntary restriction of production.

Average Prices, July, 1925, to January, 1926

In Cents

Period	Copper	Lead	Zinc	Silver
July, 1925	13.946	8.151	7.206	69.442
August	14.490	9.192	7.576	70.240
September	14.376	9.508	7.753	71.570
October	14.300	9.513	8.282	71.106
November	14.353	9.739	8.614	69.223
December	13.866	9.310	8.565	68.889
Average, 1925	14.042	9.021	7.622	69.065
January, 1926	13.822	9.255	8.304	67.795

Copper—The merger of the North Butte and Tuolumne Copper Co. has been completed, with total assets of $15,000,000. At Butte, Mont., the Anaconda company is equipping three shafts with electrical machinery with sufficient capacity to mine to a depth of 5,000 ft. At Douglas, Ariz., the Copper Queen smelter is being changed from blast furnace to a reverberatory type, and the Magma Copper Co., at Superior, is spending about $500,000 in development and other improvements. United Verde Extension reports striking a new body of high-grade ores. Calumet & Arizona will surrender its Arizona charter and incorporate under the Delaware laws. In Michigan, the Seneca mine is producing at the rate of about 1,000 tons of ore per day. The estimated refined copper production in the Michigan district in January was 13,800,000 lb., of which Calumet & Hecla Consolidated produced 8,500,000 lb., Mohawk 1,400,000, Quincy 1,100,000, Copper Range 2,000,000, and Isle Royale 800,000. Granby Consolidated Mining, Smelting & Refining Co., in British Columbia, is said to have reduced the cost of copper production during the last quarter of the year to 9.46c. per lb. The company is now producing four million pounds per month. Thus far the British Columbia winter has been unusually mild, so that many of the companies which rely on the winter snows for sledding their output to railways or tidewater have been unable to move ore or have had it moved only with difficulty and great expense. The Rhodesian Congo Concessions, in South Africa, is a new copper producer just entering the field.

Lead—The Consolidated Mining & Smelting Co. of Canada is constructing a 1,000-ton unit as an addition to its mill, making a total capacity of 4,000 tons. Lead has been reported as discovered at Arn Prior, Ontario. In Idaho, the Livingston Mines Co. reports the opening of an exceptionally large deposit of high-grade lead in Custer County, Idaho. Park-Utah Consolidated Mines Co. has completed its new 4,700 ft. aërial tramway with a daily capacity of 1,000 tons.

Gold—In British Columbia, Premier Gold Mining Co. is doubling the capacity of the mill and power plant. The discovery of gold-bearing sand has been reported in the Red Lake district, Ontario, and as a result there is a rush to this district. Three months' extension has been granted by the Canadian Government in which to do assessment work in this district by reason of isolation of the new camp. At Tonopah, Nev., the district is producing about $100,000 per month, but the monthly yield is decreasing. Alaska-Juneau produced at the rate of 175,000 tons of ore per month. Kirkland Lake, in Canada, has proven the extension of a new orebody from its 2,100 level upward to the 1,850 level. At Tonopah, the Goldfield Deep Mines Co. continues to sink its shaft, which is now at 2,160 ft. level. Round Mountain Mining Co., operating in Nevada, is planning a reorganization to secure additional funds for continued development work.

Lead and Zinc—The Joplin-Miami district is operating with 178 mills with the possibility of an overproduction and a price reduction. The January sales amounted to 83,800 tons of zinc concentrate, the largest on record. Development of new properties continues unabated. Merger of the Consolidated Lead & Zinc Co. and the Underwriter's Land Co. was perfected with the result that the new corporation, the Consolidated Lead Co., valued at about $2,500,000, will be one of the largest producers in the Joplin district. The January dividend payment of the Federal Mining & Smelting Co. was halted by an injunction alleging that the payment was illegal. The Copper King Mine, at Hillsdale, Ariz., is to be reopened as a zinc mine, it now being possible to recover the zinc by flotation.

Iron Mining — Iron mining research work is now under way at Houghton, Mich., jointly with the Michigan College of Mines and leading mine operators, to determine ways and means to utilize low-grade ores.

A permanent organization has been effected at Houghton, Mich., of the committee of representative men of the iron mining industry of Michigan, summoned by President W. O. Hotchkiss of the Michigan College of Mines to initiate a program of research directed toward the solution of problems vitally affecting the future of the industry, principally the development of economical methods of beneficiation of low-grade and high-sulphur ores. R. C. Allen, vice-president of the Ogleby Norton Co., was elected chairman; L. C. Lake, Negaunee, Mich., secretary; and O. C. Davidson, Iron Mountain, Mich., general superintendent of the Oliver Iron Mining Co., chairman of the executive subcommittee.

The committee intends giving the high-grade sulphur ores of Michigan immediate attention. A fund for research calculated to bring about an economical method of beneficiation of these ores was available before the meeting of the committee, and this money was unreservedly put at the disposal of President Hotchkiss of the Michigan College of Mines to be spent in the solution of this problem. The industry itself, the Department of Research of the University of Michigan, the Michigan Geological Survey, the U. S. Bureau of Mines and the Michigan College of Mines will co-operate in the work of research. L. P. Barrett, Michigan state geologist and appraiser of mines, and Prof. A. E. White, director of the Department of Research, University of Michigan, are members of the iron committee and attended the sessions at Houghton. The University research department already has done some research work along these lines and these experiments may be completed at the Michigan College of Mines, where there is an elaborate metallurgical equipment.

The committee meeting at Houghton was not long in progress before those present realized that the scope of the committee was so broad and lasting that a definite organization was not only justifiable but absolutely necessary. In addition to the work of organization, much discussion of major phases of the industry and definite planning was done by the committee. All the details are not ready for publication at present.

Similar work is also making progress in Minnesota. On the Minnesota ranges stripping is in progress preparatory to a busy season. A third unit is under construction by the Oliver Iron Mining Co. at its Hibbing crushing and screening plant. Underground mining continues as usual.

General—At Colorado Springs a new stock exchange has been organized replacing the old Mining Exchange. Colorado business men plan a ten-million-dollar corporation to stimulate mining, and the Boulder County Commissioners appropriate a small amount to encourage prospectors by paying for their assays. Steps are being taken to finance the new Canadian Asbestos Corporation which is a result of the merger of seven of the largest producers. Helium reserve No. 1, in Utah, has been increased by an addition of 5,155 acres. The Virginia-Carolina Chemical Co. foreclosure sale was authorized by Federal Judge Runyon at Newark, N. J. Tin stocks are low in London, but the deposits in Nigeria are promising, with the possibility of profitable operations with 4 lb. tin per cubic yard of ground. The Harriman manganese mines in Soviet Russia continue operation with standing orders for 30,000 tons of manganese ore per month.

Societies, Addresses, and Reports

Features of A.I.M.E. Program

THE revised program for the 133d meeting of the American Institute of Mining and Metallurgical Engineers, to be held at New York, Feb. 15 to 18, has just been issued. The meeting will be held at 29 West 39th St. Sessions and papers of most interest to *Mining Journal-Press* readers are shown below:

MONDAY

Mine Ventilation Committee

9:30 a.m.—Room 2. Fifth Floor, George S. Rice, Chairman.

9:30 a.m.—Opening Address by George S. Rice, Chief Mining Engineer U. S. Bureau of Mines, Washington, D. C.

9:40 a.m.—Report of Secretary, E. A. Holbrook, Dean, School of Mines, Pennsylvania State College.

10:00 a.m. — Report Subcommittee on Fans, Graham Bright, Chairman, Mining Engineer, Pittsburgh, Pa.

10:10 a.m.—"Mine Fan Characteristics." Professor L. W. Huber, Carnegie Institute of Technology, Pittsburgh, Pa.

10:30 a.m. — Discussion of Professor Huber's paper.

10:40 a.m. — "Theoretical Rating as Compared With Operating Performance of Mine Fans." A. S. Richardson, Ventilation Engineer, Anaconda Copper Mining Co.

11:00 a.m.—"New York-New Jersey Vehicular Tunnel," Illustrated. Ole Singstad, Chief Engineer New York-New Jersey Tunnel Commission.

Non-Ferrous Metallurgy

10 a.m.—Room 1001. Ninth Floor
E. P. Mathewson, Chairman

"Improvements in the Series System of Electrolytic Copper Refining Recently Developed by the Nichols Copper Co." M. H. Merriss, Assistant to the Vice-President, Nichols Copper Co., New York.

"Conductivity of Electrolytes Used in the Electrolytic Separation of Gold and Silver." F. F. Colcord, Vice-President U. S. S. Lead Refining, Inc., New York; E. F. Kern, Professor of Metallurgy, Columbia University, New York; and J. J. Mulligan, Superintendent of Refinery U. S. S. Lead Refinery, Inc.

"Leaching Mixed Copper Ores With Ferric Sulphate; Inspiration Copper Co." G. D. Van Arsdale, metallurgical engineer, Los Angeles, Cal.

"Effect of Zinc Oxide on the Formation Temperature of Some Ferrous Slags." Horace Tharp Mann, mining and metallurgical engineer, Okmulgee, Okla.

"Treatment of the Telluride-Bearing Gold Ores of the Wright-Hargreaves Mines, Ltd." W. A. Mueller, professor of non-ferrous metallurgy, Ohio State University, J. E. Grant, manager, and C. L. Heath, engineer, Wright-Hargreaves Mine, Ltd., Kirkland Lake, Ont.

Milling and Concentration

10 a.m.—Room 1101. Eleventh Floor
Galen H. Clevenger, Chairman

"Mechanism of Filtration." Arthur W. Hixson, Lincoln T. Work and Isaac H. Odell, Department of Chemical Engineering, Columbia University.

"Classification on the Witwatersrand." Bennett R. Bates, mining engineer, The Dorr Co., New York.

"An Investigation of Crushing Phenomena." A. M. Gaudin, assistant professor, Columbia University, New York City.

General discussion of milling problems, introduced by Galen H. Clevenger, Metallurgist, U. S. S. R. & M. Co., Boston, Mass.

Non-Metallic Minerals

9:30 a.m.—Room 903, Tenth Floor
Dr. H. Ries, Chairman

"The Mining and Preparation of Molding Sands." R. M. Bird, of George F. Pettinos, Philadelphia.

"The Use of Standard Tests for Molding Sands." H. Ries, professor of economic geology, Cornell University, Ithaca, N. Y.

"American Glass Sands, Their Properties and Preparation." Charles R. Fettke, associate professor geology and mining, Carnegie Institute of Technology, Pittsburgh, Pa.

"Washing and Sizing Sand and Gravel." Edmund Shaw, Editor "Rock Products," Chicago.

"Preparation and Use of Special Sands." W. M. Weigel, Mineral Technologist, U. S. Bureau of Mines, Washington, D. C.

"Magnesite and Magnesia." H. M. Henton, assistant professor of mining and metallurgy, Pullman, Washington.

"Borate Deposits Near Kramer, California." Hoyt S. Gale, geologist, Los Angeles, Cal.

Mine Ventilation Committee

2 p.m.—Room 2. Fifth Floor
Dr. R. R. Sayers, Chairman

Report on proposed activities of subcommittee on physiological studies. Dr. R. R. Sayers, Chief Surgeon Bureau of Mines, Washington, D. C.

2:10 p.m.—"Permissible Limits of Toxic and Noxious Gases in Mine and Tunnel Ventilation." Dr. R. R. Sayers.

2:30 p.m.—Discussion of Dr. Sayers' paper.

3:00 p.m.—Report on present and future activities of subcommittee on physics of ventilation. Professor A. C. Callen, Chairman, Department of Mining Engineering, University of Illinois.

3:10 p.m.—Discussion of the report of the British Institution of Mining Engineers on the "Theory of Ventilation." G. E. McElroy, Mining Engineer, U. S. Bureau of Mines, Butte, Mont.

4:00 p.m.—Report on present and future activities of subcommittee on coal-mine ventilation. Frank Haas, Chairman, consulting engineer, Consolidated Coal Co., Fairmont, W. Va.

4:10 p.m.—Discussion of some critical features in coal-mine ventilation. Frank Haas, E. A. Holbrook, J. W. Paul, and others.

4:50 p.m.—Report on desirable future activities of subcommittee on metal-mine ventilation. B. B. Gottsberger, Chairman, Professor of Mining, Yale University.

5:00 p.m.—Discussion, "Some Important Factors in Metal Mine Ventilation." Led by G. E. McElroy.

Mining Geology

2 p.m.—Room 1001. Tenth Floor
E. F. Burchard, Chairman

"Magmas, Dikes, Veins, and Contact Metamorphism. Waldemar Lindgren, professor of geology, Massachusetts Institute of Technology, Cambridge, Mass.

"Geology of the Yoquivo, Chihuahua Mining District." C. W. Hall, Vice-President, United Clay Mines Corporation, Trenton, N. J.

"The Geology and Ore Deposits of the Asientos Tepezala District, Aguascalientes, Mexico." G. E. Anderson, geologist, University of Oklahoma, Norman, Okla.

"Geology of the Zaruma Gold District of Ecuador." Paul Billingsley, geologist, Anaconda Copper Mining Co., Seattle, Wash.

"Marcasite Inclusions in Fluorite From the Central-Kentucky Barite-Fluorite Calcite Veins." William D. Johnston, Jr., Honorary Fellow in Geology, University of Cincinnati, Cincinnati, Ohio.

"Lead and Zinc in Eastern Canada." Frederick J. Alcock, geologist, Geological Survey of Canada, Ottawa, Can.

"Electrical and Electromagnetic Prospecting." Hans Lundberg, mining engineer, New York.

Dinners

6:00 p.m.—Milling Methods Committee, at Engineers Club.

6:00 p.m.—Industrial Relations Committee, at 130 West 56th Street.

Evening Entertainment

8:15 p.m.—Smoker at Mecca Temple, 133 West 55th Street.

TUESDAY, FEB. 16

Annual Business Meeting

10 a.m.—Auditorium. Third Floor
President J. V. W. Reynders in the chair.

Presentation of the reports of the president, secretary and treasurer respecting the business of the Institute during the year 1925.

Election of officers for the year 1926.

WEDNESDAY, FEB. 17

Mining Methods

10 a.m.—Room 1101. Eleventh Floor
Prof. R. M. Raymond, Chairman

"Oil Sand Mining in France and Germany." George S. Rice and J. A. Davis, U. S. Bureau of Mines, Washington, D. C.

"Top Slicing in Old Fills at El Bordo

Mine, Mexico." R. J. Mechin, mining engineer, Rivermines, Mo.

"Mining Methods in Grass Valley District, California." J. A. Fulton, mining engineer, Director School of Mines, University of Nevada, Reno, Nev., and A. B. Foote, general manager, North Star Mines Co., Grass Valley, Calif.

"The Sharpening and Handling of Drill Steel at Franklin, N. J." C. M. Haight, mining engineer, New Jersey Zinc Co., Franklin, N. J.

Industrial Relations

2 p.m.—Auditorium. Third Floor
Arthur Notman, Chairman

Discussion on employee stock ownership. Opened by George E. Roberts, vice-president, National City Bank.

C. J. Hicks, Standard Oil Co. of New Jersey.

J. M. Shore, Editor, "Service Talks," Philadelphia Rapid Transit Co.

Ground Movement and Subsidence

2 p.m.—Room 903. Ninth Floor.
H. G. Moulton, Chairman

"Coal Mine Subsidence." H. N. Eavenson, consulting mining engineer, Pittsburgh, Pa.

"Subsidence Around a Salt Well." C. M. Young, mining engineer, University of Kansas, Lawrence, Kans.

"The Gros Ventre Land Slide, Near Jackson's Hole, Wyoming." George S. Rice, chief mining engineer, U. S. Bureau of Mines, Washington, D. C.

"Ground Movement and Rock Bursts on the Rand." A discussion of the report of the South African Committee on Rock Bursts, led by George S. Rice.

Mining Methods

2 p.m.—Room 1101. Eleventh Floor
B. F. Tillson, Chairman

Symposium on Explosives

"Blasting in Coal Mines of the United States." Theodore Marvin, Managing Editor, "The Explosive Engineer," Wilmington, Del.

"Liquid Oxygen as an Explosive." F. W. O'Neil, chief engineer, Ingersoll-Rand Co., New York.

Annual Reception, Banquet and Dance

6:45 p.m.—Reception at the Waldorf-Astoria.

7:15 p.m.—Banquet. Wilbur Nelson, toastmaster.

Presentation of the James Douglas Medal.

Presentation of the Robert W. Hunt Medal.

Presentation of the J. E. Johnson, Jr., Award.

9:15 p.m.—Dancing.

THURSDAY EVENING, FEB. 18

Joint Session

Metropolitan Sections of the
American Society of Civil Engineers.
American Institute of Mining and Metallurgical Engineers.
American Society of Mechanical Engineers.
American Institute of Electrical Engineers.

National Academy of Science Advocates Research in Pure Science

Public support for research in pure science is asked by trustees of the National Research Endowment. Among those in attendance at the organization meeting of the special board held on Jan. 30 were: Herbert Hoover, Secretary of Commerce, chairman; Albert A. Michelson, president of the National Academy of Sciences; Gano Dunn, chairman of the National Research Council; Vernon A. Kellogg, permanent secretary of the National Research Council; Dr. John C. Merriam, president of the Carnegie Institution, of Washington; Owen D. Young, Dr. Simon Flexner, director of the Rockefeller Institute for Medical Research, and Dr. George E. Hale, director of Mount Wilson Observatory, Pasadena, Cal.

Other members of the fund's special board of directors are Andrew W. Mellon, Charles E. Hughes, Henry M. Robinson and John W. Davis.

VALUE IN ABSTRACT RESEARCH

The declaration was as follows:

"The trustees of the National Research Endowment, recognizing that human progress depends in large degree upon research in pure science, declare their conviction:

"1. That the United States, which already occupies a leading position in industrial research, should rank with the most enlightened nations in the advancement of pure science.

"2. That it is wiser to make large expenditures for scientific research, thus advancing civilization, improving human welfare, conserving health, and saving countless useful lives, than to tolerate unnecessary suffering and then endeavor to alleviate it at still greater cost.

"3. That research in all branches of the mathematical, physical, and biological sciences should be encouraged, because of the intellectual and spiritual value of adding to knowledge and because the greatest advances in science and in industry often result from apparently useless abstract discoveries.

"4. That scientists exceptionally qualified to widen fundamental knowledge through research are of such value to the nation that every effort should be made to facilitate their work.

"5. That the overcrowding of educational institutions, and the consequent excessive demands of teaching and administration, have further reduced the limited opportunities for research previously enjoyed by the members of their faculties.

"6. That the funds now available for the support of research in pure science in the United States are far below what our population, education, and material resources demand.

"7. That the National Academy of Sciences, created by Congressional charter, the scientific adviser of the government, and composed of leading investigators in the closely interlocked and mutually dependent mathematical, physical, and biological sciences, is peculiarly qualified to evaluate the needs of pure science in America, to stimulate its progress, and to insure the widest use of funds provided for research.

"In view of these considerations, the trustees of the National Research Endowment, established by the National Academy of Sciences, propose immediately to secure adequate funds for the encouragement of research in pure science."

New Officers for British Columbia Chamber of Mines

At the recent annual general meeting of the British Columbia Chamber of Mines, the following officers were elected for the ensuing year: Honorary presidents, Louis D. Taylor, Mayor of Vancouver; G. W. Bowen; C. P. Browning, manager for Britannia Mining & Smelting Co.; W. G. Murrin; P. J. Parker; S. J. Schofield; J. W. Stewart; R. H. Stewart; Henry Thornton, president of the Canadian National Railways; A. B. Trites; W. L. Uglow; and Charles Villiers; president, F. E. Woodside; vice-presidents, H. P. McCraney and G. S. Eldridge; treasurer W. Mason-Rooke; and secretary, Harry Browning. S. G. Blaylock, managing director of Consolidated Mining & Smelting Co.; Charles Bocking, general manager for Granby Consolidated, and W. R. Wilson, president and managing director of Crow's Nest Pass Coal Co., refused to allow their names to go before the meeting as candidates for honorary presidents. The chairman stated that the membership of the chamber had been increased from 165 to 341 during last year and that $10,000 was raised by subscription, to carry on the work of the chamber.

Concrete Institute to Meet in Chicago Feb. 23-26

The twenty-second annual convention of the American Concrete Institute is to be held at Chicago, at the Hotel Sherman, Feb. 23-26. Besides committee reports, numerous papers on various subjects will be presented.

One of the chief items of interest on the program is the presentation of a paper on reinforced-concrete track supports by Frank H. Alfred, president and general manager of the Pere Marquette Railway. There will follow a discussion on this paper in which a number of railway engineers have been invited to participate. The general subject of the discussion will be railroads and concrete, and participants in it will attempt to answer the question: "Just how far have the railroads gone in a progressive attitude toward modern design and construction with concrete?"

New Officers for U.E.S.

At the annual meeting of the Board of Trustees of United Engineering Society held Jan. 28, the following officers were elected for the ensuing year: president, W. L. Saunders; first vice-president, Bancroft Gherardi; second vice-president, Lewis D. Rights; secretary, Alfred D. Flinn; treasurer, Jacob S. Langthorn; assistant treasurer, Henry A. Lardner.

Men You Should Know About

Augustus Locke, of San Francisco, is in Boston.

William Spence Black, mining engineer, of Boston, sailed last week for South America.

Courtenay De Kalb is in Florida. He is lecturing at Daytona Beach, at the University of Florida, and at other points.

Allen H. Rogers, of Rogers, Mayer & Ball, has just returned to New York after spending four months in Chile and Bolivia.

Frank M. Estes, general manager of the Dolores Esperanza Corporation, operating at Madera, Chihuahua, Mexico, has been in El Paso, Tex.

R. S. Archibald, general manager for C. K. Quinn & Co. in the Michigan district, is spending several weeks on business in the City of Mexico.

Durand A. Hall, mining engineer, of Berkeley, Calif., has returned to his home after making an examination of the Fortuna mine, in Arizona.

Major A. J. Flood, of Toronto, has been appointed mine manager of the Laval-Quebec Mines, operating in the Rouyn mining area of northwestern Quebec.

Dr. J. W. Beede, chief geologist for the Dixie Oil Co., Inc., operating in West Texas, has been elected president of the newly organized West Texas Geological Society.

Roy H. Elliott has returned to San Francisco and has opened his office as consulting mining engineer at Room 713, Mechanics Institute Building, 57 Post St., San Francisco, Calif.

Viscount Masatoshi, professor at the Tokyo Imperial University, and an authority upon metallurgy, has recently made an extensive investigation of the oil-shale industry in Manchuria.

E. A. Julian, mining manager for the Wingfield interests in Nevada, was in Reno recently from his San Francisco headquarters to attend a meeting of the Nevada Mine Operators' Association.

O. D. Fellows, for fourteen years assistant superintendent of the stamp mills of the Copper Range company, in the Michigan copper district, has resigned to take a position at Newton Centre, Mass.

George A. Kerwin, until recently smelter superintendent at the Mammoth smelter, Kennett, Calif., has been appointed general manager of the Mason Valley Mines Co., succeeding Emmet D. Boyle, deceased.

L. R. Robins, superintendent for the Tonopah Belmont Development Co. at Tonopah, Nev., recently made a short visit to Wickenburg, Ariz., where his company is developing the McNeill property, a promising silver-gold-lead mine.

Charles Evans Hughes, former U. S. Secretary of State, has been named to represent the American Petroleum Institute before the Federal Oil Conservation Board in connection with the board's inquiry into national petroleum conditions.

Gordon Campbell, president, and **Thomas Hoatson, Thomas F. Cole, George Newett**, and **Thomas Collins**, directors of the Calumet & Arizona Mining Co., recently made an inspection of the properties of the company, at Valedon, N. M., and Warren, Ariz.

H. Mortimer Lamb, secretary of the British Columbia branch of the Canadian Institute of Mining and Metallurgy, was recently presented with an aneroid barometer in appreciation of the good work that he has done both for the branch and the Institute as a whole. Mr. Lamb, for many years was secretary of the Institute, and now is secretary emeritus. The presentation was made by W. Fleet Robertson at a luncheon in the Hudson's Bay dining room, Vancouver, B. C.

Colonel W. B. Thompson

Colonel W. B. Thompson, president of the Magma Copper Co., who was ill in London, is reported to be improving, and will soon leave for the Continent to recuperate.

C. R. Pearce, who has a world-wide experience in deep sinking, at the end of last November passed through Brisbane from central Queensland, Australia, on his way to the Papuan oil fields. Mr. Pearce has successfully followed the occupation of boring in Europe, Asia, the United States, the Pacific Islands, Mexico, and South America. In Queensland he lately performed a boring feat which is claimed there to be a world record. This consisted of getting down 906 ft., with the aid of a 6 in. pipe and a plant made for a depth of only 500 ft., and finding water. He has now been engaged by the Cape Vogel Oilfields Co.

Obituary

Captain Thomas Wakefield, Jr., general underground foreman for the Miami Copper Co. since 1907, died at Phoenix, Ariz., Feb. 1, after an illness of over a year. Captain Wakefield was born in Penzance, Cornwall, England, on Aug. 26, 1866, and came to this continent at the age of eighteen. Before coming to Miami in 1907 he worked in various mining districts of Minnesota, Alaska, and Newfoundland. He is survived by his widow, five daughters, two sons, three brothers, several grand children and his father, Thomas Wakefield, Sr., who resides in Miami.

Colonel Daniel Bertsch Wentz, one of the most prominent coal operators in the country and president of the National Coal Association, died on Feb. 8, at Wyncote, near Philadelphia, Pa. He was fifty-two years old. Colonel Wentz received the Distinguished Service Cross for his services during the war as chief of the fuel and forage division of the Quartermaster Corps. He also received the rank of Chevalier of the Legion of Honor from France for service in the war. In December, 1925, Colonel Wentz was elected president of the American Mining Congress for the current year. Colonel Wentz, who was graduated from Harvard, was active in the social life of Philadelphia. His club included the Union League, the Racquet, the Huntingdon Valley Country, Rittenhouse, Radnor, Rose Tree and Whitemarsh Hunt.

Emmet D. Boyle

Few mining men in Nevada have endeared themselves to the people of a state as did Emmet Derby Boyle, nor have many mining engineers had the wide variety of experience. Mr. Boyle was born at Virginia City, Nev. His father was a mine superintendent upon the Comstock Lode for many years and the son Emmet spent his early boyhood in a mining atmosphere, which undoubtedly influenced him in his selection of a mining career. He was graduated from the Nevada State University and later obtained his degree of mining engineer from the same university. Like many mining engineers, he secured his first experience in miscellaneous positions during his vacations, and when he had been graduated he rose from miner and sampler to mine surveyor for the British American Corporation at Rossland, B. C. His next position was as civil engineer and mine captain with Compania La Esperanza y Anexas, El Oro, Mexico. He then returned to Nevada in 1902 and undertook the development of the Como mine and engaged in consulting work. He married Veda Margaret McClure, who survives him, in 1903. In 1909 he took charge of gypsum mining operations at Mound House and designed the quarry and mill equipment. In 1910 he became State Engineer of Nevada; later he was tax commissioner, and in 1914 he was elected Governor of the state. In this position he gave widespread satisfaction and showed ability of a high order in handling the affairs of state. He was a member of the U. S. Treasury Gold Production Committee in 1917-18. Retiring from political life to his mining engineering, he was selected to rehabilitate the Mason Valley Mines Co. In the position of general manager he undertook and successfully carried through the reopening and re-equipping of this group of mines. His sudden death caused sorrow to his many friends and associates throughout Nevada and the Western states.

Recent Technical Publications

Reviews, Abstracts, and References

Californian Magnesite

"Magnesite in California," by Walter W. Bradley, is an illustrated report of 147 pages recently issued by the California State Mining Bureau, San Francisco, as Bulletin No. 79. The introductory part includes a brief history of magnesite mining in California, and a discussion of its uses, with particular reference to oxychloride cement manufacture and testing. All known deposits are shown on a map of the state. The chief producing counties, in the order named, are Santa Clara, Tulare, San Benito, and Napa. The peak of production was in 1917, exceeding 200,000 tons. In 1924 it was a little over 67,000 tons. Although the wartime demand for refractory uses has fallen off, the expansion of other uses, particularly in the plastic trades, has maintained production at a considerably higher level than during the pre-war period. The last 100 pages are devoted to discussions of deposits and operations. Mr. Bradley's report is well written, and is particularly valuable because of the scarcity of literature on magnesite, and because California is one of the two magnesite-producing states, Washington having become a producer in 1916.

OLIVER BOWLES.

Poetry—It is not often that a book of poetry is issued that appeals particularly to engineers—that is, that touches their professional life; for such a book as Housman's "Last Poems," for instance, could hardly fail to appeal to an engineer or any one else. But the "Season of Ships," by Charles Nicholls Webb, contains several poems that are directly concerned with mining, some of which have been published by the *E. & M. J.* Others are concerned with ships, lumberjacks, and soldiers. The author works on the market desk of the Duluth *News-Tribune*, poetry apparently being a side line, though one that he evidently finds pleasure in carrying on. The book is published by the *Queen City Sun*, Virginia, Minn.

Iron in the Philippines — *The Far Eastern Review* for December (16 Jinkee Road, Shanghai, China; price 50c. Mexican) contains a descriptive article of five pages, on "Iron in the Philippines," by Warren D. Smith. The production of iron is small, but some high-grade deposits of hematite exist. Smelting and economic features of the industry are covered.

Surveying Boreholes — Dr. John S. Owens has contributed a paper to the Institution of Mining and Metallurgy, published in the *Bulletin* for January, on "A New Instrument for Surveying Boreholes." Several of the undesirable features of former instruments are eliminated in the device described, which records its indications by the use of light-sensitive paper. Copies of the article, which is of 18 pages and includes working drawings of the instrument, may be obtained for 1s. 6d. each from the Offices of the Institution, Cleveland House, 225 City Road, London, E. C. 1.

Gas Analysis—"The Bureau of Mines Orsat Apparatus for Gas Analysis" is the title of Technical Paper 320, by A. C. Fieldner, G. W. Jones and W. F. Holbrook, 18 pages, obtainable for 5c. from the Superintendent of Documents, Washington, D. C. The bulletin describes the apparatus used in the gas laboratory of the bureau at the Pittsburgh station for the complete and partial analysis of gases. Tables of combustion data are appended.

Ontario Mining—Parts 2, 3, and 6 of the Thirty-fourth Annual Report of the Ontario Department of Mines, 1925, have recently been issued and are obtainable on request to the department at Toronto, Ont. Part 2 (58 pp.) contains articles on "Gypsum in Ontario," by George E. Cole, and "Geology of the Gypsum Deposits of Southwestern Ontario," by W. S. Dyer. Part 3 (pp. 38, with map) is a description of "The Matabitchuan Area," by E. W. Todd. Part 6 (106 pp., with maps) contains articles on "Gold Deposits of Kenora and Rainy River Districts," by E. L. Bruce; "Kamiskotia Gold Area," by F. L. Finley; "Tashota-Onaman Gold Area," and "Lightning River Gold Area," by T. L. Gledhill.

Bauxite — Robert J. Anderson contributes an article on "The Outlook for Bauxite in 1926" to the Jan. 9 and 16 issues of *The Mining Journal* (London; price 8d.). Developments of a technical nature are described.

Gyratory Crushers — "The Development of the Gyratory Crusher" is discussed by Hugo W. Weimer in *Rock Products* for Jan. 23 (Chicago; price 25c.). This is the first of a series of articles by Mr. Weimer on rock-crushing machinery and its use and application. Succeeding articles will discuss other types of crushers than gyratories, screening and other equipment, and plant design.

Washing Barytes—In the magazine mentioned in the preceding paragraph is also a short illustrated article on "Washing Barytes in the Georgia Field."

Hydrometallurgy—*The Mining Congress Journal* has a series of articles on this subject in the February issue including: "Hydrometallurgy at the Advent of 1926," by Stuart Croasdale, four pages; "Heap Leaching Low-Grade Ores at Bisbee, Ariz.," by A. W. Hudson, two pages; and "Notes on Copper Leaching," by G. W. Van Arsdale, three pages. (Washington, D. C.; 30c.)

Siberian Ores—"Siberian Ores and Their Importance" are discussed in the leading article in the *Russian Review* for Feb. 1 (Russian Information Bureau, 2819 Connecticut Ave., Washington, D. C.; price, 15c.) The situation and the extent of the deposits of metallic ores are briefly covered.

Lubrication of Drills—The January issue of *Lubrication* (free of charge from the Texas Co., 17 Battery Place, New York City) is devoted to the lubrication of pneumatic machinery, of which rock drills form an important class.

Economic Geology—*Economic Geology* for January-February (Lancaster, Pa.; price 75c.) contains the following papers: "Metasomatism and Linear 'Force of Growing Crystals,'" 55 pages, by H. C. Boydell; "Saline Lakes of the Mohave Desert Region," nine pages, by W. F. Foshag; "Origin of Pyrite Deposits, St. Lawrence County, N. Y.," three pages, by W. J. Miller; "Intergrowth of Certain Minerals," two pages, by W. H. Newhouse; and "Volcanic Dikes and Oil-bearing Formations, Ecuador," 11 pages, by G. Sheppard.

Canadian Survey—The annual report of the Topographic Survey of Canada, for the fiscal year ending March 31, 1925, has recently been published as a 37-page illustrated bulletin, with maps, and is obtainable from the Department of the Interior, Ottawa, on request.

Patents

Time Fuse—No. 1,570,733. Jan. 26, 1926. Wilhelm Eschbach, Troisdorf, near Cologne-on-the-Rhine, Germany. An electric time fuse for blasting cartridges.

Drill Bit — No. 1,571,348. Feb. 2, 1926. C. O. Stee, Butte, Mont. Design for a rock-drill bit.

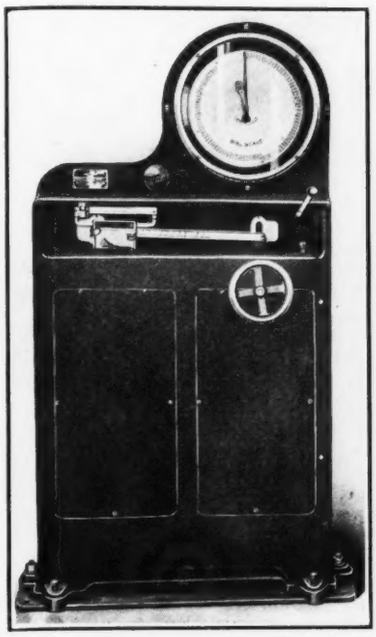
Hydrometallurgy—No. 1,570,777. Jan. 26, 1926. R. D. Pike, San Francisco. Sulphide ores are subjected to the action of a solution containing ferric chloride or ferric sulphate, at a temperature at or above the melting point of sulphur, the sulphides thus being decomposed. The Pike process was described briefly by A. W. Allen on page 112 of the Jan. 16 issue of *Mining Journal-Press.*

No. 1,570,858. Jan. 26, 1926. W. G. Perkins, London, England, assignor to Metals Production Co. of North America, Inc., New York City. A step of the process of ammoniacal leaching of ore, comprising the application to the ore of a mixture of steam and ammonia.

No. 1,571,054. Jan. 26, 1926. Martin Hosenfeld, Berlin-Siemensstadt, Germany, assignor to Siemens & Halske, Aktiengesellschaft, Siemensstadt, near Berlin, Germany. A method of producing silica which comprises mixing a powdered insoluble substance with the jelly setting from an ore leach, removing the water, and pulverizing the resulting product.

No. 1,571,502. Feb. 2, 1926. Lionel Venn-Brown, Longueville, New South Wales, Australia. Moistened ore is subjected to the action of hydrochloric acid gas, dried, and heated to a sufficient temperature to convert the contained base metal into compounds insoluble in non-acid solutions and to volatilize any uncombined arsenic. The remaining soluble chlorides are then leached out with a non-acid leach liquor. The metals are recovered in the usual ways, and the chlorine in combination with iron chloride.

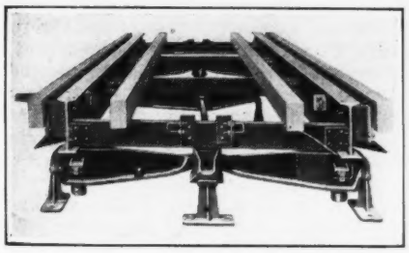
Mining Method—No. 1,570,386. Jan. 19, 1926. J. D. MacCarthy and H. O. Moulton, Ishpeming, Mich. Mining apparatus comprising a system of overhead trackage, suspended from roof-supporting timbers, a power unit supported by the trackage, and a carrier adapted to travel thereon, and a shovel-skip suspended from the carrier.



Indicating dial for quick weighing

This scale may be fitted with a variety of beams. The one here shown, consisting of an indicating dial, is particularly useful if rapid weighing must be done. All of the ordinary types of weighing beams may also be had to suit the customers' needs.

the scale may be fitted with a full-capacity direct-reading dial that will indicate the weight up to the limits for which the scale is built. Such a dial is shown above.



Platform foundation and balance beams

This scale is designed for quick, accurate work. The platform is 10 ft. wide and 28 ft. long or big enough to accommodate even the largest of motor trucks. The scale beam proper may assume any one of several shapes to suit the needs of the user.

Pocket Transit Again Improved

Announcement of the addition of a second graduated arc to the Brunton pocket transit, on which the per cent grade may be read directly from the clinometer vernier, has been made by William Ainsworth & Sons, of Denver, Colo., exclusive licensees under the D. W. Brunton patents. This, together with the improved sight apertures, the enlarged hole in the mirror with hair-line and double-level vials on the vernier, have added greatly to the utility of this little instrument.

Since the pocket transit was first placed on the market in 1895, more than 25,000 have been sold to civil, mining, and military engineers, geologists, mine managers, and others, for preliminary surveys, reconnoissance, and for geological field work, for which purpose it has supplanted most other instruments.

The case is of aluminum, 2¾x2¾x1¼ in. in dimensions and weighs 8 oz. Though the instrument was designed primarily for use as a hand device, it may be used on a standard camera tripod for running long tangents and for vein tracing and on a specially designed protractor as an alidade for plane-table work. Bulletin C-8 describing the instrument and its uses will be sent upon request.

Clear-water Centrifugal Pumps in Two New Designs

Two types of clear-water centrifugal pumps are now being placed upon the market by the Pelton Water Wheel Co., of San Francisco. The standard DS type is a double-suction split case, bronze-fitted single-stage volute unit designed for operation against heads up to 225 ft. and where hard continuous service with a minimum of attention is required. The impeller is bronze of the inclosed type with a shaft threaded to receive removable bronze sleeves which cover the shaft inside the pump and through the stuffing boxes. Bearings are of the ring-oiling type. The inboard or motor-end bearing is provided with a removable and renewable babbitt-lined bearing shell, and the bearing is parted at the center line to facilitate easy replacement of the shell when necessary; and the outboard bearing is a combination of journal and thrust, the journal part being of identical design with the inboard bearing and the thrust being of the ball type designed to receive the full unbalanced thrust in either direction, although the unit is of the balanced type, the incoming water being divided into two equal parts delivered on each side of the impeller. Stuffing boxes are of the water-sealed type provided with adjustable bronze packing glands conveniently placed. To prevent air leakage a water-seal device is provided, consisting of suitable channels which conduct water under pressure from the volute to lantern glands surrounding the shaft within the stuffing box. The unit is arranged for direct connection to motor or steam turbine.

Type ST pump is a compact two-stage pump of the horizontal split-case type. The impellers are of the inclosed type and are of bronze with renewable wearing rings. Each impeller discharges into a separate diffusion ring which is cast in one piece of bronze and is designed especially for the conditions of the particular installation. Bearings and thrust as well as stuffing boxes are similar in design to DS type.

Both pumps are suitable for mine drainage within their pressure limitations and also for mill-water supply, clear water returns and general water supply.

Two New Drifting Drills

Addition of two new rock drills to its "Waugh" line has been announced by the Denver Rock Drill Manufacturing Co. of Denver, Colo.

In one of these, the Model 7 Waugh drifting drill, the manufacturers present a pneumatic hammer drill of simple and symmetrical construction. Design of this machine is conservative, although it is claimed that many original features of proven value have been incorporated. The drill steel is rotated through ratchet, pawl, and rifle bar.

The valve is of the tubular type and operates axially in the machine. It is completely housed within the cylinder and is fully protected against rough usage.

Drop forgings and high-grade alloy steels scientifically heat treated are used throughout. Provision is made for easy replacement of parts ordinarily subjected to heaviest service and excessive wear. Ratchet ring and pawls are reversible, doubling their life.

Lubrication is effected by the Waugh automatic air line oiler, which eliminates inefficient oil chambers, packings, plugs and other parts in the machine proper, and contributes to higher drilling efficiency and long dependable service.

The other drill, Model 17, is similar in design to the Model 7, but is heavier and more powerful.

Trade Catalogs

Shovels—Marion Steam Shovel Co., Marion, Ohio, has issued Bulletin 317 entitled "Crowding the Blasting Crew." This is a pictorial representation of quarry projects and intended particularly for shovel owners in the lime, stone and cement industries.

Asbestos Covered Wire—The Rockbestos Products Corporation, of New Haven, Conn., has issued a bulletin in colors, 30 pages, covering its line of asbestos-covered wires and cables for various services. This catalog is intended to interest manufacturers of mining machinery who are supplied by the company with both asbestos-covered magnet wire and lead cables up to as high as 500,000 circular mils. These cables are insulated entirely with asbestos and impregnated with flame and moisture resistance compounds. Another bulletin entitled "A Little Journey with Rockbestos" has also been received from the company.

Pressed Steel Parts—A booklet entitled "Steelprest Common-Sense in Steel Dollars," devoted to a discussion of the advantages of using pressed steel parts, has been received from the Heintz Manufacturing Co., Front St. and Olney Ave., Philadelphia, Pa.

Material Distributor—The Hardinge material distributor for distributing feeds to screens and other flat surfaces is described in Bulletin No. 22 of the Hardinge Co., York, Pa.

Pumps—Pelton Types DS and ST pumps are covered in Bulletin No. 24 (16 pages) received from the Pelton Water Wheel Co., San Francisco and New York.

Boilers — A bulletin of Combustion Engineering Corporation, New York, is devoted to the description of the "Combustion" steam generator, a new development of the company.

Gaskets—Catalog 26, issued by the Metallo Gasket Co., 12 Bethany St., New Brunswick, N. J., covers the company's line of "Metallo" gaskets.

New Machinery and Inventions

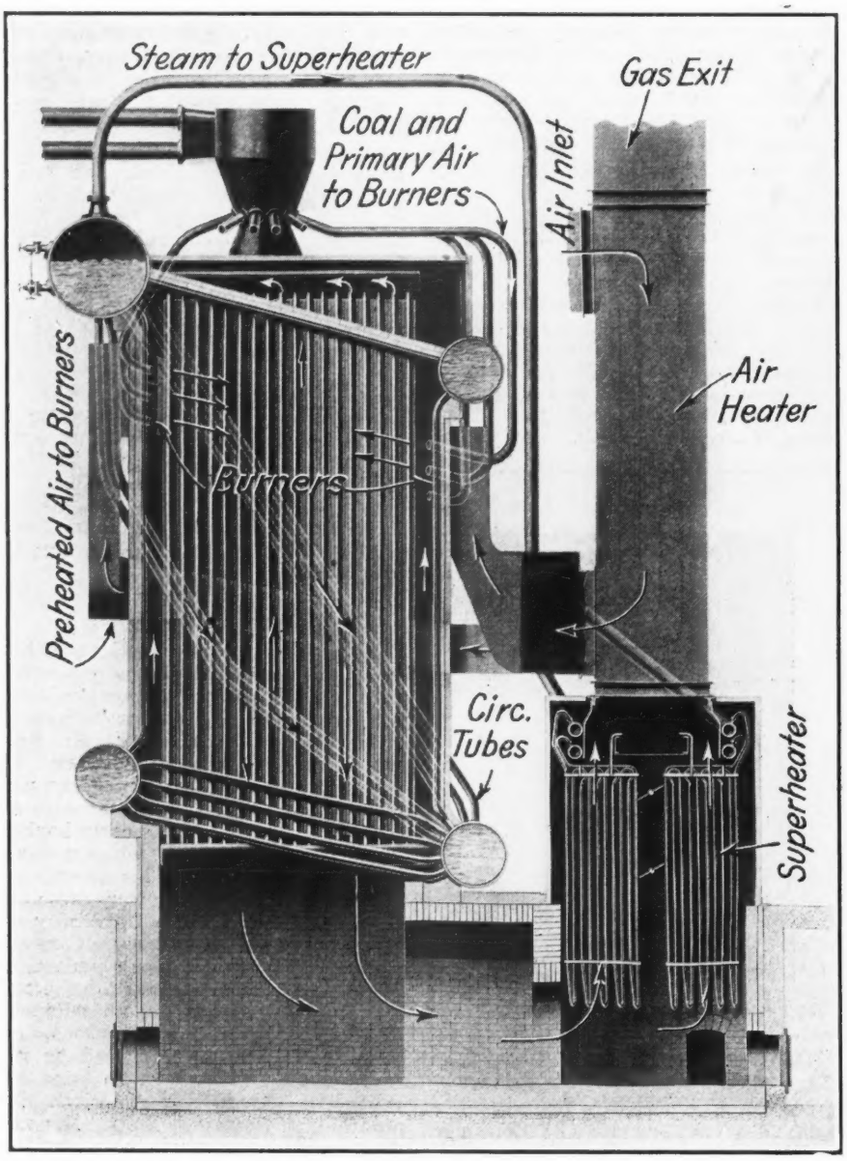


Fig. 1—View showing general arrangement of boiler superheater and air heater

New Steam Generator Introduced

Heating Surface for Given Output Reduced—Quick Pick-up of Load—No Refractories

A type of boiler in which the area of the heating surface for a given output has been materially reduced, through exposing practically the entire heating surface to the radiant heat of the fire, and the limitations on the furnace temperatures imposed by the refractories comprising the boiler furnace have been obviated, has been recently announced by the Combustion Engineering Corporation, 43 Broad St., New York City.

The boiler consists of four drums with interconnecting water tubes. The large drum shown at the upper left-hand corner in Fig. 1 serves as a steam and water drum and is fed from the regular feed-water supply.

Three other drums, placed as shown, are interconnected with water tubes which form two sides, top and water screen of the furnace. Headers connected with the steam drum and lower right drum, and interconnected with water tubes, form the other two walls of the furnace.

The vertical tubes forming the four walls are of the fin type—that is, each tube has two longitudinal steel fins welded on it diametrically opposite each other and when placed in position the fins meet, thus presenting a continuous water-cooled surface to the radiant heat of the furnace.

Water circulation between the steam drum and lower right drum, from which all the tubes are supplied, is through two rows of five tubes each located outside of the boiler setting, as indicated in Fig. 1.

Coal and primary air are supplied through a distributor located above the boiler to burners placed in each of the four corners of the furnace, a short distance below the drums. Each burner has a series of nozzles and is directed to give a turbulent action in the combustion chamber. From the point of combustion the flame and gases pass downward through a multi-tubular water-screen formed by the connecting tubes between the two lower drums, thence through a chamber to the superheater and finally through the air preheater to the stack or induced-draft fan as the case may be.

Secondary air for combustion enters the air heater at the top and passes through it in the opposite direction to that of the gas, being finally discharged to the burners through sheet-metal ducts carried around the boiler setting. Some of the advantages claimed for this boiler by the manufacturer are the large reduction in heating surface for a given output, and quick pick-up of load, owing to the large surface exposed to the radiant heat of the fire; flexibility of the heating surface arrangement and water circulation provided. Another advantage claimed is the absence of refractories.

New Mine Scales Intended for Weighing Trucks

Mining companies whose properties are situated some distance from a railroad must depend upon motor trucks or horse-drawn wagons to get their crude ore to the shipping point. It therefore is often desirable for these companies to have their own scales, which should be of a size sufficient to accommodate and weigh these vehicles.

To meet this need the Fairbanks-Morse Co. has produced the scale shown in the accompanying illustration, several of which have been placed in operation during the past year or so. This is a scale of 30 tons' capacity having a platform 10 ft. wide and 28 ft. long. It may be furnished with a variety of beams. Thus it may be equipped with a plain full-capacity beam with a tare bar of sufficient size to accommodate the largest of trucks, or it may be furnished with a full-capacity type registering beam. This latter type of beam records the weight in type on a ticket. If business is "rushing" or where trucks follow each other in quick succession

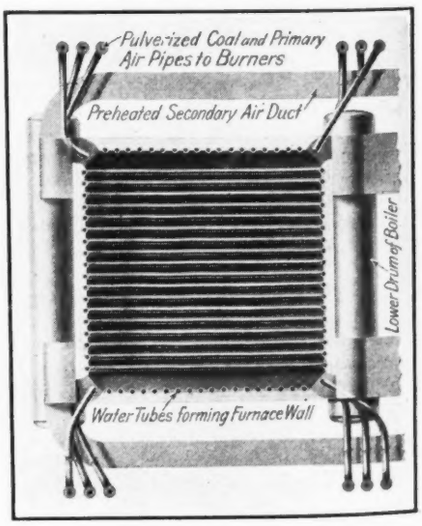

Pulverized Coal and Primary Air Pipes to Burners
Preheated Secondary Air Duct
Lower Drum of Boiler
Water Tubes forming Furnace Wall

Fig. 2—Plan of combustion chamber at a point between upper drums and burners

The Market Report

Copper Improves as Zinc Weakens

Large Volume of Copper Business at 14.25c.—Zinc Drops Under 8c.—Lead Easier

New York, Feb. 10, 1926—Strength in the domestic copper market contrasts with weakness in lead and zinc, particularly the latter. The volume of copper business has been excellent, with firmer prices but lighter buying during the last few days. Lead is easier in sympathy with weakness in London, and the zinc market is "sloppy," with little buying. Tin and antimony both have picked up during the week. Silver reached a new low for the year on Feb. 5, but has reacted since.

Copper Producers Holding at 14.375c. Delivered

Rumors of the proposed Copper Export Association that became more insistent last Thursday—though not mentioned officially until yesterday—had a bullish effect on the London market, and this was reflected in extremely heavy buying in the domestic market. More metal was sold on Thursday than during some entire weeks in recent months. Prices ranged from 14.125c. to 14.375c., the latter representing large sales in the Middle West. Since Thursday, however, several large sellers have been holding at 14.375c., but others have sold freely at 14.25c. and have taken the business. Today, sales have been made at 14.30c. and 14.375c., but the opinion prevails that the latter figure should represent the bottom of the market within a day or two. The foreign price has ranged from 14.45c. to 14.55c. c.i.f., generally a little above domestic parity. Dealers abroad have found themselves short and are bidding up the price. Domestic sales are mostly for March-April delivery.

Daily Prices of Metals

Feb.	Copper N. Y. net refinery*	Tin		Lead		Zinc
	Electrolytic	99 Per Cent	Straits	N. Y.	St. L.	St. L.
4	13.875@14.125	62.00	62.875	9.25	9.10	8.00@8.05
5	14.00	62.25	63.125	9.25	9.10	8.00
6	14.00	62.25	63.125	9.25	9.10	8.00
8	14.00	62.25	63.25	9.225	9.10	7.975
9	14.025	62.375	63.375	9.20	9.075	7.85@7.95
10	14.10	63.125	64.125	9.20	9.075	7.825
Av.	14.021	62.375	63.313	9.229	9.092	7.954

*The prices correspond to the following quotations for copper delivered: Feb. 4th, 14.125c.@14.375c.; 5th, 6th and 8th, 14.25c.; 9th, 14.275c.; 10th, 14.35c.

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for deliveries constituting the major markets, reduced to the basis of New York cash, except where St. Louis is the normal basing point, or as otherwise noted. All prices are in cents per pound. Copper is commonly sold "delivered," which means that the seller pays the freight from the refinery to the buyer's destination.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other shapes. Cathodes are sold at a discount of 0.125c. per lb.

Quotations for zinc are for ordinary Prime Western brands. Quotations for lead reflect prices obtained for common lead, and do not include grades on which a premium is asked.

London

Feb.	Copper			Tin		Lead		Zinc	
	Standard		Electrolytic						
	Spot	3M		Spot	3M	Spot	3M	Spot	3M
4	60¼	61¼	66½	282¼	278	34 3/16	33 15/16	36 13/16	36½
5	60¼	61¼	66½	283⅜	278⅞	34 1/16	33 15/16	36 13/16	36 7/16
8	59⅝	60⅝	66¼	284½	279½	33¾	33¾	36⅜	36
9	59⅞	60⅞	66¼	284½	279	33⅝	33⅝	36¼	36
10	60⅜	61⅜	67	287¾	281¼	33½	33 9/16	36 1/16	35⅞

The above table gives the closing quotations on the London Metal Exchange. All prices in pounds sterling per ton of 2,240 lb.

Silver, Gold, and Sterling Exchange

Feb.	Sterling Exchange "Checks"	Silver		Gold London	Feb.	Sterling Exchange "Checks"	Silver		Gold London
		New York	London				New York	London	
4	4.86	67	30 15/16	84s11½d	8	4 85⅞	67	30 15/16	84s10¼d
5	4.86	66⅞	30 13/16	84s11½d	9	4 85⅞	67⅛	30 15/16	84s10½d
6	4 85⅞	67	30⅞	...	10	4 85⅞	67	30⅞	84s11½d

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver, 999 fine. London silver quotations are in pence per troy ounce of sterling silver, 925 fine. Sterling quotations represent the demand market in the forenoon. Cables command three-eighths cent premium.

Zinc Looks Very Weak

Small sales, with producers failing to attract business by cutting prices, have featured the week in the zinc market. Buyers apparently sensed the purport of the statistics issued today and declined to buy, in any large volume. Figures as given herewith show an increase in stocks of more than 5,000 tons during the month of January. Retorts in operation at the end of the month showed a small increase, but the figure for Dec. 31 had also increased, and this was reflected in the large production in January. It seems probable that consuming capacity is being maintained, but that buyers hope to meet their requirements at more favorable prices. High-grade zinc in New York is quoted at 9.50c. to 9.75c. per lb., the spread between that and Prime Western being somewhat narrower than in recent months.

U. S. Zinc Statistics

Tons of 2,000 Pounds

Stock Jan. 1	9,295
Produced	56,389
	65,684
Shipped	51,384
Stock, Jan. 1	14,300
Shipped from plant for export	242
Retorts operating Jan. 31	96,229

Lead Market Easier in East

The continued decline in the London market, especially for spot lead, is having a slightly weakening influence on the New York lead market. The American Smelting & Refining Co. continues its contract price at 9.25c., New York, but at current levels it is possible to sell even foreign bullion lead at a concession from this level, and foreign ore lead has, of course, been sold in the domestic market for some time. A prominent electrical company has bought a substantial tonnage in the last two or three days at

9.15c., New York, and other consumers have also been quoted this price for any delivery.

Most of the rather good business during the last week has been done in the Middle West, where the influence of the London quotations is not so strong. The bulk of the sales was made on a basis of 9.10c., St. Louis, for chemical grades, and down to 9.05c. for desilverized. Producers have very little lead left to offer for February, and some have even sold most of their March production. They are in no mood to reduce prices so long as they are in such an excellent statistical position, though realizing that if London continues to decline, prices are likely to decline in New York also, with a probable similar effect in St. Louis, though St. Louis prices have been known to be above those in New York in times past when lead was being freely imported into the country. It may be that a small amount of Mexican bullion lead will be required to meet the spring demands of domestic consumers, and that the lifting of this off the London market will arrest the decline there; if so, the market would seem to be likely to be stabilized near the current level.

Foreign consumption of lead continues to be unsatisfactory, especially in Germany, some sellers reporting that they have sold little or nothing in various countries that until recently took several thousand tons a month.

Tin Quiet but Firm

Tin buyers have not been particularly active during the last week, though a good tonnage was sold yesterday, and that may have had something to do with the marked advance in prices today. In general, however, consumers are buying only small lots that they require for current needs. Much of yesterday's business, it is thought, was for the account of a London house. Spot tin is scarce. April has sold at concessions of from ¾ to 1c. below the spot and prompt prices.

Silver Quiet

On Feb. 5 the low price for the year was recorded in New York. Sales by the Indian bazaars were responsible for the decline, but renewed buying from this quarter on the following day, with some support from China, caused a reaction upward, and prices have since been steadied. The market closes quiet with no apparent tendencies.

Mexican Dollars: Feb. 4th, 51¼c.; 5th, 51⅛c.; 6th and 8th, 51¼c.; 9th, 51⅜c.; 10th, 51¼c.

Francs at New Low

Francs dropped to a new low for the year yesterday; most other European exchanges, including sterling, have been steady. Closing cable quotations on Tuesday, Feb. 9, were: francs, 3.68c.; lire, 4.03¾c.; and marks, 23.81c. Canadian dollars, ⅛ per cent discount.

Correction—An incorrect average monthly price for silver in London was published in *Mining Journal-Press* of Feb. 6, owing to the fact that Handy & Harman had reported no quotation for Jan. 1. The quotation on that day was 31 1/16d. and the average for the month, including that figure, was 31.322d. instead of 31.308d. as published.

Other Metals

Quotations cover large wholesale lots unless otherwise specified

Aluminum—99 per cent grade, 28c. per lb.; 98 per cent, 27c. London, 98 per cent, £118 per long ton.

Antimony—Per pound, duty paid, New York: Chinese brands, spot, 21½@22c. February arrival, 19¼@19½c. Cookson's "C" grade, spot, 23½c. Market quiet but firm.

Bismuth—$3.30@$3.35 per lb., in ton lots. London, 12s. 6d.

Cadmium—60c. per lb. London, 1s. 9d. for Australian metal.

Iridium—$340 per oz. for 98@99 per cent. Nominal. London, £70@£75 for 99.5 per cent.

Nickel—Ingot, 35c.; shot, 36c.; electrolytic, 39c. (99.75 per cent); London, £170@£175 per long ton.

Platinum—$115 per oz. refined officially quoted. Sales also at $110@$112. Crude, $109. London, £23@£24 for refined; crude, £21@£22.

Quicksilver—Per 75-lb. flask: $87@$88 for spot and forward. San Francisco, $88.67. London, £15@£15. Market steady.

The prices of **Cobalt, Germanium Oxide, Lithium, Magnesium, Molybdenum, Monel Metal, Osmium, Palladium, Radium, Rhodium, Ruthenium, Selenium, Tellurium, Thallium, Tungsten,** and **Zirconium** are unchanged from the issue of Feb. 6.

Metallic Ores

Tungsten Ore—Per unit of WO_3, N.Y.: Wolframite, $12@$12.50; Western scheelite, $12.50@$13. Domestic demand very light, and prices largely nominal. European demand good.

Chrome Ore, Galena and **Pyrite Radio Crystals, Iron Ore, Manganese Ore, Molybdenum, Tantalum,** and **Vanadium Ores** are unchanged from quotations in the Feb. 6 issue.

Zinc Ore and Lead Prices Unchanged

Joplin, Mo., Feb. 6, 1926

Zinc Blende	Per Ton
High	$59.90
Premium blende, basis 60 per cent zinc	$54.00@$55.00
Prime Western, basis 60 per cent zinc	$53.00
Fines and slimes, basis 60 per cent zinc	$42.00@$50.00
Average settling price, all zinc	$54.44
Galena	
High	$123.30
Basis 80 per cent lead	$120.00
Average settling price, all lead	$120.94

Shipments for the week: Blende, 20,462; lead, 2,556 tons. Value, all ores the week, $1,423,210.

Buyers made no effort to lower zinc prices, and sellers disposed of the entire week's production of 18,660 tons. Unsold stocks of zinc do not exist at present, this week's shipment closing out the small margin of unsold ore. Sellers are holding a portion of the lead production each week, and the accumulation of unsold galena is around 10,000 tons.

Platteville, Wis., Feb. 6, 1926

Zinc Blende	Per Ton
Blende, basis 60 per cent zinc	$56.00
Lead Ore	
Lead, basis 80 per cent lead	$122.50

Shipments for the week: Blende, 1,074 tons; lead, 40 tons. Shipments for the year: Blende, 4,483; lead, 140 tons. Shipments for the week to separating plants, 1,916 tons blende.

Non-Metallic Minerals

Amblygonite, Andalusite, Asbestos, Barytes, Bauxite, Borax, Celestite, Chalk, China Clay, Diatomaceous Earth, Emery, Feldspar, Fluorspar, Fuller's Earth, Garnet, Gilsonite, Graphite, Greensand, Gypsum, Ilmenite, Iron Oxide, Lepidolite, Limestone, Magnesite, Manjak, Mica, Monazite, Ocher, Phosphate, Potash, Pumice, Pyrites, Quartz Rock Crystals, Rutile, Silica, Spodumene, Sulphur, Talc, Tripoli and **Zircon** are unchanged from prices in the Feb. 6 issue.

Mineral Products

Arsenious Oxide (White arsenic)—3¾c. per lb. Nominal. London, £14@£15 per long ton.

Copper Sulphate, Sodium Nitrate, Sodium Sulphate, and **Zinc Oxide** are unchanged from prices in the Feb. 6 issue.

Ferro-Alloys

Ferrocerium, Ferrochrome, Ferromanganese, Ferrophosphorus, Ferrosilicon, Ferrotitanium, Ferrotungsten, and **Ferro-uranium** are unchanged from prices in the Feb. 6 issue.

Ferrovanadium—Per pound of V contained, f.o.b. works, $3.40@$3.90.

Metal Products

Rolled Copper—Sheets, 22¾c.; wire, base price, 16c. per lb.

Lead Sheets—Full, 13c. per lb.; cut, 13¼c.

Nickel Silver—29¾c. per lb. for 18 per cent nickel Grade A sheets.

Yellow (Muntz) Metal—Dimension sheets, 20½c. per lb.; rods, 17½c.

Zinc Sheets—12c. per lb., f.o.b. works.

Refractories

Chrome Brick, Firebrick, Magnesite Brick, Silica Brick, and **Zirkite** are unchanged from prices in the Feb. 6 issue.

Steel Market Good—Pig Iron Dull—Coke Still High

Pittsburgh, Feb. 9, 1926

Buying of steel has continued to increase, though at a slow rate, and as the accumulation of specifications which existed in a few lines has begun to run out, the rate of steel mill operation promises to decrease to a moderately high level, the recent level having been exceptionally high.

Pig Iron.—Market remains dull. Bessemer, $21; basic, $20; foundry, $20.50, f.o.b. Valley furnaces.

Connellsville Coke.—Eastern buying of coke, as an anthracite substitute, has put prices up farther. Run of oven, $11@$12; yard crushed, $14@$14.50.

Expect Higher Prices for Better Grade Industrial Diamonds

The general anticipation for 1926 is that there will be a better demand for industrial diamonds of high quality at higher prices; but for common qualities prices will have a tendency to decrease, owing to heavy stocks and the education of the buyer, who with knowledge will more and more appreciate the value of high-grade stones. This is the view expressed by J. K. Smit & Zonen's of Amsterdam, Holland, in their annual circular on the market for diamonds for industrial purposes. Early in the year the market in Holland for industrial white diamonds (borts) became quiet and prices went down about 15 per cent. The principal reason for this decrease was the invention of the "Wheel Dresser" which reduced the consumption of diamonds by about 50 per cent. Consumers bought only just the amount needed and dealers, being afraid prices would go down still more, sold from their stock at low prices, with the result that smaller turnover and smaller profits have not made this a successful year for them. However, toward the end of the year several buyers were again in the Holland market, and owing to the prosperous automobile industry in the United States the demand from this country was particularly good. Then, owing to the fact that the emery wheel dresser was found not to be the success which was anticipated, as the wheels were not finished accurately and caused many finished auto cars to be rejected, several manufacturers again bought industrial diamonds, which are known to save labor and also guarantee good finish.

Toward the end of 1925 prices for large industrial borts from 2 to 10 carats rose again 10 per cent. The demand for smaller borts (round and octahedron), which are chiefly used in Europe, remained stable during the whole year, and prices were maintained. There is always a steady demand for Brazilian borts, which are the hardest and most compact kind of diamonds, and prices remained the same.

Buyers of flat borts which are used for wire drawing, were very particular as regards quality, and generally would buy only the stones which were quite clear in the center, but there was a scarcity in these, as they naturally fetch much higher prices when sold for polishing purposes.

Buyers who do not understand diamonds thoroughly are not aware of the fact that a stone which has grown together in many different directions is much harder and has more resistance against splitting than a stone which is regularly formed and consists of flat layers.

Prices for flats, except for those with clear centers, went down about 15 per cent in 1925. Stones of 2½ to 10 carats were chiefly in demand, but smaller borts from ½ to 1 carat were also sought.

New substitutes for industrial diamonds were announced and offered, their hardness stated to be 9.80 against a hardness of 10.— on the hardness scale of minerals. However, it was proved that the difference in hardness between diamonds and their substitutes is so great that these substitutes have very little value. Every consumer of carbons knows that even between carbons there are some stones which do 100 times the work which a softer carbon does.

During all of 1925 the market for crushing bort was very bad. World production being approximately 1,000,000 carats per annum and the consumption not half that quantity, the prices would therefore have been much lower if the market had not been regulated by the London Diamond Syndicate, which handles nearly 90 per cent of the world production of diamonds.

The Common Goods Combination, which has the privilege of buying all the common goods and bort from the syndicate, was compelled to buy such large quantities of crushing bort that it had about 6,700,000 carats of bort and similar goods on its hands. The syndicate held over a million carats, and dealers and consumers, knowing this, bought only just the quantity needed, as the price (which was about 17s. per carat at the beginning of the year and 12s. 6d. at the end) is still three times the pre-war market.

A lower price in crushing bort will certainly increase the consumption and the common industrials particularly will be sold more. The crushing bort price is the weak spot in the Syndicate's diamond price policy, and as this price affects the value of both the lower quality industrials and the cheaper polished diamonds, the Syndicate will therefore have to choose between a lower price level, stimulating consumption, or decreasing the production, especially from the B. C. K. alluvial fields in Portuguese South Africa, which produced about 500,000 carats of mostly bort and wherefrom information comes that the production can be easily raised to a million carats.

The Holland market was visited regularly by dealers from the United States, England, France, and Germany, and it still remains the principal market for industrial diamonds.

During all of 1925 there was a good demand for carbons, especially for the extra and medium qualities, and prices have risen considerably.

Although the production of carbons has decreased from about 30,000 carats per annum to about 25,000 carats, there is no reason for the 80 per cent increase in prices. This increase is due chiefly to the fact that American dealers went right into the interior of the carbon districts and explained the differences in qualities to the miners, and then paid high prices for the better qualities. Finally it is the consumer who has to pay for this knowledge.

America an Important Factor in Marketing Production

America buys the largest quantity of the carbon production, and there being no restriction in this case, as in rubber, from other countries, it is the American dealers who make their nation pay for what is—in the opinion of many—a wrong business system.

Owing to the high prices of carbons, more and more borts are being used on the Continent for truing emery wheels, and the demand for carbon has certainly decreased, although they are for boring purposes by far the better stones to use, as they are not so likely to break as white diamonds.

The new fashion in bracelets which are set all round with brilliants created a large demand for stones running from 5 to 6 per carat, which demand raised the price 10 per cent. The market was very weak in roses, and the demand for small polished stones (8 facets) was very dull, and prices declined about 15 per cent.

On the Continent the demand for polished diamonds was, and still is, small, but from the United States the demand was good, by which the Amsterdam market, which specializes in extra fine cut diamonds, profited mostly. The last three months of 1925 were very good and even Mellee prices went up 5 per cent.

The market was stimulated by the information that the New London Diamond Syndicate was formed for five years, and was reported to be in a very strong position, controlling about 90 per cent of the world's production.

Prospects for 1926 for industrial cut diamonds and also for carbons is good. The general financial improvement will certainly affect the diamond market, and it is hoped that the harmonious results of the Locarno agreement will affect it still more. No business is influenced so greatly by the political and financial situation of the world as the diamond trade.

Rand Gold Mine Dividends Less in 1925

The following comparative statement includes most of the dividends declared recently by gold mining companies on the Witwatersrand:

	1925 June Per Cent	1925 December Per Cent	1924 Total Per Cent
Aurora West	70	..	20
Brakpan	22½	25	45
City Deep	15	15	50
Consolidated Main Reef	2½	2½	12½
Crown Mines	30	30	80
Ferreira Deep	2½	..	8½
Geduld	16½	18½	33½
Government Areas	32½	32½	65
Langlaagte	2½	2½	12½
Meyer & Charlton	35	35	100
Modder B	40	35	110
Modder Deep	65	70	145
New Modder	60	55	100
New Primrose	..	2½	7½
New State Areas	7½	7½	..
New Unified	..	2½	2½
Randfontein Estate	5	..	5
Rose Deep	7½	5	22½
Simmer and Jack	..	10	20
Springs Mines	15	16½	32½
Van Ryn Deep	27½	22½	62½
Van Ryn Estates	7½	5	20
Village Deep	2½	2½	8½
West Springs	..	7½	..
Wit Deep	8½	10	15
Sub Nigel	3½	5	8½
Transvaal Gold Mine Estates	3½	2½	8½

Mount Lyell Mining & Railway Co. Makes Good Progress

The report of the directors of the Mount Lyell Mining & Railway Co. of Australia for the year ended Sept. 30, 1925, says:

Mines—Good progress has been made with raising Blocks shaft to the surface to facilitate efficient and economical working of the lower levels in North Mount Lyell mine.

Ore Reserves—North Mount Lyell mine, 1,006,426 tons assaying 6 per cent copper, 1.33 oz. of silver, and 0.015 oz. of gold per ton. Figures show that during the last two years accession to ore reserves has been greater than the tonnage extracted. This is eminently satisfactory in view of the limitations of development work that have characterized several years past.

Reduction Works — Concentration plant treated 112,503 tons of North Mount Lyell ore, producing 34,076 tons of concentrates. Smelted 3,586 tons of North Mount Lyell ore, 34,111 tons of concentrates, and 8,844 tons of pyrites. Produced 6,542 tons of blister copper, containing 6,483 tons of copper, 137,253 oz. silver, and 2,198 oz. gold. The decrease in production compared with last year is due to the latter including 867 tons of copper from ore won and concentrated during preceding period.

All plants operated well. Total metal recoveries were highly satisfactory, namely 92.73 per cent copper; 83.56 per cent silver, and 84.61 per cent gold. The price of copper has remained low compared with that of other commodities. Average price of electrolytic copper £67 6s. 0d. Under awards made by the Commonwealth Arbitration Court, rates of wages at Mount Lyell have again increased; the basic wage is now 79s. per week, an increase of 3s. 6d. per week since the last report. Continued attention to improvement in treatment methods has resulted in higher recoveries and lower costs, and technically, results of mining and treatment operations were very satisfactory. Metal Manufacturers Proprietary, Ltd., continues to take a considerable proportion of the output. Some falling off in its business occurred during the latter half of the year, but the directors are satisfied that local requirements will soon absorb practically the whole production.

Financial—Operations for the year ended Sept. 30 last, have resulted in a net profit of £174,605 after allowing for prospecting and development £11,273, depreciation £31,314, superannuation fund £3,000, and taxation £10,043. Credit balance to profit-and-loss account, £486,976. Owing to shipping difficulties more than the usual quantity of copper was on hand at the end of the year. This has affected the profits shown by the accounts, but compensating advantage should accrue next year. Liquid assets are as follows:

Metals and middle products		£212,555
Debtors		240,486
Bank balances		86,718
Commonwealth bonds and bank deposits		179,967
Stocks		391,260
Total		£1,110,986
Less		
Creditors	£137,002	
Superannuation and group insurance	3,000	
Drafts in transit	11,000	
London transfers	9,623	
		160,625
Surplus		£950,361

Imports and Exports of Ores and Metals in December, 1924 and 1925

Compiled by the U. S. Department of Commerce

In pounds unless otherwise specified

Imports

	December, 1924	December, 1925
Antimony		
Ore	167,098	63,240
Liquated, regulus, or metal	1,391,869	2,301,583
Copper		
Ores	6,466,689	5,749,924
Concentrates	4,106,731	5,094,785
Regulus, coarse metal and cement copper	.....	4,532
Total	10,573,420	10,849,241
From		
Spain	810,672	209,839
Canada	935,785	2,492,523
Mexico	2,572,550	2,533,213
Cuba	3,360,000	2,222,080
Chile	1,106,170	2,707,426
Peru	248,277	57,968
Venezuela	1,137,920	.....
Other countries	402,046	626,192
Unrefined, black, blister and converted copper in pigs, bars, and other forms	42,214,456	32,805,877
From		
United Kingdom	1,380,079	21,996
Canada	2,285,234	4,089,147
Mexico	5,237,403	5,281,593
Chile	14,545,500	2,406,560
Peru	3,848,815	10,440,891
Portuguese Africa	12,871,218	7,013,447
Other countries	2,046,207	551,943
Refined copper	9,104,925	14,219,549
Old and clippings for remanufacture	793,679	593,717
Composition metal, copper chief value	.....	13,873
Copper manufactures	7,038	12,309
Brass		
Old and clippings for remanufacture	1,149,942	849,241
Manufactures of brass	71,458	106,436
Lead		
Ore and matte	7,708,438	7,601,592
Bullion or base bullion	10,568,753	19,427,690
Pigs, bars, other forms, and old	273,187	1,400,469
Manufactures of, except type metal	24,496	11,025
Manganese ore, long tons	15,598	36,908
Pyrites, long tons	23,598	6,228
Tin		
Tin ore, tons	22	30
In blocks, bars and pigs	11,737,511	16,684,843
From		
United Kingdom	2,174,674	4,731,227
British Straits Settlements	7,918,098	10,562,257
Hongkong	20,142	358,673
Australia	112,000	314,074
Other countries	1,512,597	718,612
Zinc		
Ore, free	.....	.....
dutiable	1,428,907	3,460,756
Blocks, pigs and other forms	11,320	5,881
Zinc dust	62,185	3,827

Exports of Copper, Lead and Zinc

	December, 1924	December, 1925
Copper		
Ores, concentrates, matte, and regulus	27,594	.....
Copper and manufactures of	98,462,419	75,026,469
Refined in ingots, bars and other forms	89,464,760	66,935,323
Exported to		
Belgium	6,165,881	9,852,374
France	15,363,754	13,237,726
Germany	24,841,407	11,484,568
Italy	8,421,038	11,199,621
Netherlands	12,275,945	2,197,726
Spain	775,387	1,736,729
Sweden	1,681,995	1,239,183
United Kingdom	14,830,845	12,061,397
Canada	2,164,860	1,990,018
British India	1,010,579	.....
China	672,000	694,400
Japan	447,918	564,927
Other countries	813,151	676,654
Old and scrap copper	962,473	249,843
Pipes and tubes	132,906	212,874
Plates and sheets	361,269	959,955
Rods	5,924,254	2,823,679
Wire	475,321	955,549
Insulated copper wire and cable	987,664	2,281,744
Other manufactures of copper	152,772	607,502
Lead		
Pigs, bars and other forms		
From domestic ore	383,269	2,209,375
From foreign ore	20,959,462	10,376,613
Exported to		
France	1,344,615	750,685
Germany	2,632,867	2,912,786
Italy	1,344,434	336,046
Netherlands	448,020	1,288,355
United Kingdom	13,752,222	5,490,533
Other Europe	896,252	1,434,185
Argentina	359,229	.....
Brazil	470,426	179,281
Japan	.....	.....
Other countries	94,666	194,117
Other lead manufactures	1,474,005	1,734,813
Zinc		
Ores and concentrates	784	5,912
Dross	.....	1,057,754
Zinc (spelter) in slabs, blocks, or pigs	29,349,168	4,763,212
Exported to		
Belgium	1,736,735	335,980
France	2,285,535	1,680,114
Germany	728,459	606,161
Italy	1,120,351	952,062
United Kingdom	18,633,315	726,447
Other Europe	2,563,883	.....
Canada	92,051	348,383
Japan	1,716,380	.....
Other countries	472,459	114,065
In sheets, strips, and other forms	399,275	862,537
Zinc dust	369,911	400,814
Other zinc manufactures	119,114	236,702

Mining Stocks—Week Ended February 6, 1926

Stock	Exch.	High	Low	Last		Last Div.
COPPER						
Anaconda	New York	50	45⅝	49⅞	Ja.16,Fe.23,Q	0.75
Arcadian Consol.	Boston	*65	*55	*55		
Ariz. Com'l	Boston	12½	11½	12	Jy.21, Jy. 31 SA	0.50
Calaveras	N. Y. Curb	3¼	3⅛	3⅛		
Calumet & Arizona	New York	63½	60¾	63⅜	De.4, De.21 QX	1.50
Calumet & Hecla	Boston	15½	14½	15	Nov.30,De.15 Q	0.50
Cerro de Pasco	New York	65⅞	63	65½	Ja. 14, Fe. 1, Q	1.00
Chile Copper	New York	35½	33⅞	35	Ma.3, Ma.29, Q	0.62½
Chino	New York	...	...	17	Sept., 1920	0.37½
Con. Coppermines	N. Y. Curb	2	1¾	2		
Copper Range	Boston	19⅜	18	19½	May, 1925	1.00
Crystal Copper	Boston Curb	*50	*46	*47		
East Butte	Boston	4	3½	3¾	Dec., 1919	0.50
First National	Boston Curb	*16	*16	*16	Feb., 1919	0.15
Franklin	Boston	*80	*75	*75		
Granby Consol.	New York	23½	22⅛	23¼	May, 1919	1.25
Greene-Cananea	New York	12⅝	11½	12⅜	Nov., 1920	0.50
Hancock	Boston	...	...	*80		
HoweSound,new,r.t.c.	New York	30⅞	29⅜	30⅜	Ja. 5, Ja. 15 Q	0.50
Inspiration Consl.	New York	25⅜	24⅜	25⅛	De.17, Ja.4, Q	0.50
Iron Cap	Boston Curb	2⅜	2 1/16	2⅛	May, 1923	0.15
Isle Royale	Boston	12⅛	11⅝	12⅛	No.30, De.5	1.00
Jerome Verde Dev.	N. Y. Curb	1⅜	1¼	1⅜		
Kennecott	New York	57⅜	55½	57	Ma.5,Ap.1 Q	1.00
Lake Copper	Boston	1½	1	1	June, 1925	0.50
Magma Copper	New York	44⅝	42⅜	44⅛	De.31, Ja.15,	0.75
Mason Valley	N. Y. Curb	2¼	2	2¼		
Mass Consolidated	Boston	...	...	*50	Nov., 1917	1.00
Miami Copper	New York	13	11⅞	13	Feb.1, Feb.15 Q	0.25
Mohawk	Boston	35	33	34⅜	Jan. 30, Ma.1 Q	1.00
Mother Lode Coa.	New York	7⅜	7	7⅜	De. 11, De. 31	0.37½
Nevada Consol.	New York	13⅜	12⅞	13⅛	De. 18, De.31 Q	0.25
New Cornelia	Boston	20⅝	20	20⅛	Fe.5, Fe.23 Q	0.30
North Butte	Boston	3¼	3	3⅛	Oct., 1918	0.25
Ohio Copper	N. Y. Curb	*69	*65	*69	No. 14, De. 2	0.05
Old Dominion	Boston	19	18⅛	19	Dec., 1918	1.00
Phelps Dodge	Open Mar.	†122	†118	...	De.21, Ja.2 Q	1.00
Quincy	Boston	21⅛	18⅜	21	Mar., 1920	1.00
Ray Consolidated	New York	12¼	11⅝	12⅛	Dec., 1920	0.25
Ray Hercules	N. Y. Curb	...	...	11⅝		
St. Mary's Min. Ld.	Boston	37	35	37	May, 1925	3.00
Seneca Copper	New York	8⅛	8	8⅛		
Shannon	Boston	*69	*60	*60	Nov., 1917	0.25
Shattuck Arizona	New York	65⅞	63⅛	64	Jan., 1920	0.25
Superior & Boston	Boston	1	*80	*80		
Tenn. C. & C.	New York	16	14⅝	15⅜	De.31, Ja.15,Q	0.25
United Verde Ex.	N. Y. Curb	29⅜	29	29⅛	Ja.5, Fe.1, Q	0.75
Utah Copper	New York	100	98⅛	100	De.18, De.31, Q	1.25
Utah Metal & T	Boston	1⅜	*94	1½	Dec., 1917	0.30
Victoria	Boston	*50	*50	*50		
Walker Mining	Salt Lake	1.65	1.32½	1.35		
NICKEL-COPPER						
Internat. Nickel	New York	45⅜	42⅛	43⅜	De.17,De.31,Q	0.50
Internat. Nickel, pfd.	New York	102½	102⅛	102⅜	Ja.25, Fe.1, Q	1.50
LEAD						
Gladstone M. M. Co.	Spokane	*37	*35	*37	Ja. 1, Ja. 10 M	0.0½
National Lead	New York	172	165	168	De.11, De.31 Q	2.00
National Lead pfd.	New York	117	117	117	Aug.21, Se.15	1.75
St. Joseph Lead	New York	46	44⅛	45⅞	De.10,De.20QX	1.50
ZINC						
Am. Z. L. & S.	New York	12⅛	9⅝	11⅛	May., 1920	1.00
Am. Z. L. & S, pfd.	New York	48⅛	40⅜	46⅛	Nov., 1920	1.50
Butte C. & Z	New York	6	5⅜	6	De.10, De.24	0.50
Butte & Superior	New York	15⅜	14⅛	15	De.15, De.31 Q	0.50
Callahan Zn-Ld	New York	2⅜	2⅛	2⅛	Dec., 1920	0.50
Eagle Picher	Cincinnati	34⅛	33⅛	33⅞	Fe. 15, Mar.1	0.40
Eagle Picher, pfd.	Cincinnati	...	...	110	Ja.1, Ja.31	1.50
New Jersey Zn.	N. Y. Curb	...	...	208	No.20, De.10 X	2.00
United Zinc	N. Y. Curb	...	...	*70		
Yellow Pine	Los Angeles	*32½	*32½	*32½	Se.10 Se.21 Q	0.04
GOLD						
Alaska Juneau	New York	1⅝	1½	1⅝		
Argonaut	Toronto	*22½	*20	*22½		
Barry-Hollinger	Toronto	*51	*30	*43½		
Carson Hill	Boston	*45	*45	*45		
Consol. W. Dome L.	Toronto	*24	*22½	*23½		
Cresson Consol. G.	N. Y. Curb	2½	2⅛	2⅛	De.31, Ja. 7	0.10
Crown Reserve	Toronto	*21	*17	*20½	Jan., 1917	0.05
Dome Mines	New York	18⅜	17⅛	18⅜	De.31, Ja.20, Q	0.50
Golden Center	N. Y. Curb	2	1½	2		
Golden Cycle	Colo. Springs	†1.57	† 1.56	...	No.30, Dec.10 Q	0.03
Hollinger Consol	Toronto	19.00	18.90	18.90	Fe. 9, Fe. 25	0.08
Homestake Mining	New York	51½	50	51	Fe.20,Fe.25 Mo	0.50
Kirkland Lake	Toronto	1.25	1.16	1.16		
Lake Shore	Toronto	13.02	12.51	12.75	De.1,De.15 XQ	0.10
McIntyre-Porcupine	New York	24½	23⅜	24½	Fe.1, Ma.7	0.05
Newray	Toronto	*42	*41	*41		
Night Hawk Pen	Toronto	*12	*10	*10		
Noranda	N. Y. Curb	*18⅜	*16	*17⅝		
Portland	Colo. Springs	†*65	†*62	....	Oct., 1920	0.01
Rand Mines	New York	34⅜	34⅜	34⅜	Au.17, Au.25	1.52
Teck-Hughes	Toronto	3.77	3.55	3.71	Ja. 15, Fe. 1	0.05
Tom Reed	Los Angeles	*57½	*55	*55	Ma.10Ma.20	0.02
Tough-Oakes	Toronto	*65	*49	*64		
United Eastern	N. Y. Curb	...	...	*45	July, 1924	0.05
Vipond Cons.	Toronto	2.00	1.93	1.95		
Wright-Hargreaves	Toronto	9.50	9.10	9.25	De.15, Ja. 1 QX	0.10
Yukon-Alaska Trust	N. Y. Curb	....	....	20½	.....	.....
GOLD AND SILVER						
Carnegie Metals	Pittsburgh	17	16½	17		
Con. Cortez	N. Y. Curb	*6	*6	*6		
Con. Virginia	San Francisco	.*19½	*15½	*19		
Continental Mines	N. Y. Curb	...	...	*45		
Dolores Esperanza	N. Y. Curb	*75	*70	*71	July, 1923	0.05
Premier Gold	N. Y. Curb	2 3/16	2 3/16	2 3/16	De.18, Ja. 4	0.08
Tonopah Belmont	N. Y. Curb	4	3½	3½	Se.15, Oc.1	0.05
Tonopah Extension	N. Y. Curb	112	*56	*65	Apr. 1925	0.05
Tonopah Mining	N. Y. Curb	6¼	5⅜	6¼	Se.30, Oc.21	0.07½
Unity Gold	N. Y. Curb	...	...	*20		
West End Consol.	N. Y. Curb	...	...	*24	Mar., 1923	0.05
Yukon Gold	N. Y. Curb	*58	*58	*58	June, 1918	0.02

Stock	Exch.	High	Low	Last		Last Div.
SILVER						
Alvarado	N. Y. Curb	...	...	1	Oct., 1920	0.50
Beaver Consol	Toronto	*85	*80½	*81	May. 1920	0.03
Castle-Trethewey	Toronto	1.68	1.60	1.66	.....	.....
Coniagas	Toronto	4.00	4.00	4.00	May, 1924	0.12½
Keeley	Toronto	1.80	1.74	1.88	Ma.1,Ma.15 X	0.12
Kerr Lake	N. Y. Curb	1½	1¼	1½	Oc. 1, Oc.15 Q	0.12½
La Rose	Toronto	*34	*31	*32	Apr., 1922	0.10½
Lorrain Trout Lake	Toronto	1.10	1.10	1.10	Jy. 2, Jy. 15	0.05
McKinley-Dar.-Sav.	Toronto	*24½	*23	*23	Oct., 1920	0.03
Mining Corp. Can.	Toronto	3.97	3.55	3.87	Ja. 16, Ja.30	0.12½
Nipissing	N. Y. Curb	7	6⅞	6⅞	De.31, Ja.2, Q	0.15
Temiskaming	Toronto	*15¼	*15¼	*15¼	Jan., 1920	0.40
SILVER-LEAD						
Ahumada	New York	8⅝	8¼	8⅜	De.15,Ja.2, X	0.25
Alta Merger	Salt Lake	†3½	†1½	...	.....	.....
Bingham Mines	Boston	53¼	51	53	De.19, De.20 Q	1.00
Cardiff M. & M.	Salt Lake	*59	*58	*58	De.16, No.18	0.10
Chief Consol.	Salt Lake	3.50	3.35	3.35	Fe. 1,	0.10
Emma Silver	Salt Lake	†1½	†1	...	.....	.....
Erupcion	Boston Curb	1⅝	1⅝	1⅝	De.15, Ja.2, X	0.10
Federal M. & S.	New York	105	95	105	.....	.....
Federal M. & S., pfd.	New York	97½	90½	90½	No.25, De.15 Q	1.75
Hawthorne Mines	N. Y. Curb	*32	*23	*28		
Hecla Mining	N. Y. Curb	18	17⅞	18	No.15, De.15 Q	0.50
Iron King Mining	Salt Lake	*35	*30½	*35	.....	.....
Keystone Mining	Salt Lake	*65	*58	*60	Au.12, Au.26	0.07½
Lucky Jim	Spokane	*14⅝	*14½	*14⅝	.....	.....
Mammoth Mining	Salt Lake	2.95	2.85	2.95	De. 16, De. 23	0.10
Marsh Mines	Spokane	*10½	*9⅜	*9¾	Se.15, Oc.1	0.15
Ontario Silver	New York	...	...	10	.....	.....
Park Utah	Salt Lake	8.40	8.10	8.40	Se.15, Oc.1	0.15
Prince Cons	Salt Lake	2.00	1.25	1.25	.....	.....
Silver King Coal	Salt Lake	9.45	9.40	9.40	De.15, Ja.2, QX	0.35
Silversmith	Spokane	*41	*39¾	*41	De.31, Ja.10	0.02
Tamarack-Custer	Spokane	*58	*56	*56	Sept., 1924	0.25
Tintic Standard	Salt Lake	13.12½	13.00	13.00	De.16,De.23,QX	0.30
Utah-Apex	Salt Lake	11¾	8⅜	10⅞	Ja.1, Ja.5, Q	0.35
Western Utah Copper	N. Y. Curb	...	...	*8	.....	.....
IRON						
Bethlehem Steel	New York	48	46⅞	47½	July, 1924	1.25
Colorado Fuel & Iron	New York	37⅝	35⅛	36¾	May, 1921	0.75
Gt. North'n Iron Ore	New York	26⅜	25⅝	26	De. 4, De. 28,	0.75
Inland Steel	New York	41	40½	40¾	Fe.15, Ma.1 Q	0.62½
Mesabi Iron	N. Y. Curb	2	2	2	.....	.....
Replogle Steel	New York	13⅞	13⅝	13¾	.....	.....
Republic I. & S.	New York	58½	57	58	May, 1921	1.50
Republic I. & S. pfd.	New York	95	94½	94½	Ma.15, Ap.1, Q	1.75
Sloss-Sheffield S. & I.	New York	135⅜	123	128	De.10, De.21 Q	1.50
Sloss-Shef. S.&I. pfd.	New York	...	...	102	De.21, Ja.2, Q	1.75
U. S. Steel	New York	134	132½	132⅝	Fe.27, Ma.30 XQ	1.75
U. S. Steel pfd	New York	126⅞	126	126½	Fe.3, Fe.27, Q	1.75
Virginia I. C. & C.	New York	...	..	43	Jan., 1924	1.50
Virginia I.C.&C.pfd	New York	...	...	77	De.15, Ja.2,	2.50
VANADIUM						
Vanadium Corp.	New York	31¾	31½	31½	Fe.1, Fe.15, Q	0.50
ASBESTOS						
Asbestos Corp.	Montreal	94	90	92½	De.31, Ja.15 Q	1.50
Asbestos Corp., pfd.	Montreal	115½	114	114½	De.31, Ja.15, Q	1.50
SULPHUR						
Freeport Texas	New York	28	25⅞	26⅞	Nov., 1919	1.00
Texas Gulf	New York	135⅛	126½	132¼	De.1, De.15,QX	2.75
DIAMONDS						
De Beers Consol.	New York	...	...	29	Ja.26, Fe.2	0.23
PLATINUM						
So. Am. Gold & P.	N. Y. Curb	4	4	4	.....	.....
MINING, SMELTING, REFINING AND GENERAL						
Amer. Metal	New York	54¾	52	54¾	Fe.18, Ma. 1, Q	1.00
Amer. Metal pfd	New York	120	120	120	Fe. 19, Ma. 1, Q	1.75
Amer. Sm. & Ref.	New York	141½	136½	138½	Ja.15, Fe.1,	1.75
Amer. Sm.&Ref.pfd.	New York	117½	116½	116½	Fe.5,Ma.1, Q	1.75
Consol. M. & S.	N. Y. Curb	220½	220	220½	De.31, Ja.15	0.75
Federated Metals	N. Y. Curb	21	20	20	.....	.....
Newmont Mining	N. Y. Curb	56	53½	56	De.31, Ja.15,	0.60
Southwest Metals	N. Y. Curb	...	...	2	.....	.....
U. S. Sm. R. & M.	New York	47½	46	47½	Ja.1, Ja.7, Q	0.87½
U.S. Sm. R.&M.pfd.	New York	49	48⅝	48⅝	Ja.1, Ja.7, Q	0.87½

* Cents per share. † Bid or asked. Q, Quarterly. SA, Semi-annually. M, Monthly. K, Irregular. I, Initial. X, Includes extra. The first date given is that of the closing of the books; the second that of the payment of the dividend.

Boston quotations courtesy Boston Stock Exchange; Toronto quotations those of the Standard Stock Exchange of Toronto; by courtesy of Arthur E. Moysey & Co.; Spokane, Pohlman Investment Co.; Salt Lake, Stock and Mining Exchange and Henry Sachs: Colorado Springs, Colo.

LONDON QUOTATIONS, WEEK ENDED JANUARY 30, 1926

	High	Low	Last	Date	Per Cent
Aramayo Mines (25 frs.)	81/10½	80/—	80/—	Feb. 1926	5(c)
British Platinum	7/3	7/—	7/—	Feb. 1925	2½
Burma Corpn. (10 rupees)	18/7½	17/3	17/4½	Feb. 1926	6 annas.*
Bwana M'Kubwa	7/11	7/6	7/7½		
Camp Bird	5/7½	5/—	5/3		
El Oro	6/10½	6/6	6/9	Nov. 1924	2½*
Esperanza	2/4½	1/1½	2/3		
Frontino & Bolivia	8/—	7/4½	7/6	Jan. 1926	1¼
Mexican Corporation	23/1½	20/—	21/9		
Mexican Mines of El Oro	38/9	31/3	37/6	Dec. 1925	12½*
Nechi (pref. 10s.)	1/6	1/—	1/6	1921–22	25
Oroville Dredging	4/—	3/7½	4/—	Dec. 1923	3¾
Ouro Preto	2/9	2/6	2/6	May 1925	2½
St. John del Rey	10/9	10/3	10/6	June 1925	6¼
San Francisco Mines	30/10½	28/9	30/6	Jan. 1926	22½
Santa Gertrudis	21/7½	20/9	21/—	July 1920	5
Selukwe (2s. 6d.)	11/6	10/6	10/7½	April 1917	6¾
S. American Copper	5/3	4/9	5/—	Nov. 1917	75
Tanganyika	47/—	43/—	43/9	Sept. 1925	5
Tomboy	3/9	3/6	3/9	Jan. 1926	5
Union Minière du Haut-Katanga (Brussels) 100 Fr.	6.600	6.495	6.550	July 1925	150(b)

* Free of British income tax. (b) Belgian francs. (c) Swiss francs.